Teilenummer...: **971948**
part number
no. de pièce

Magnetmembrandosierpumpe
Magnet diaphragm metering pump
Pompe de dosage de membrane d'aimant

Größe/Abmess..: 7,1L/h bei 7 bar
size/dimens.
grandeur/dimensio

Normtyp/DIN: BT4A B.-NR. 81.71.76
standard type
type normalisé/DIN:

Werkstoff.....:
material
matériau:

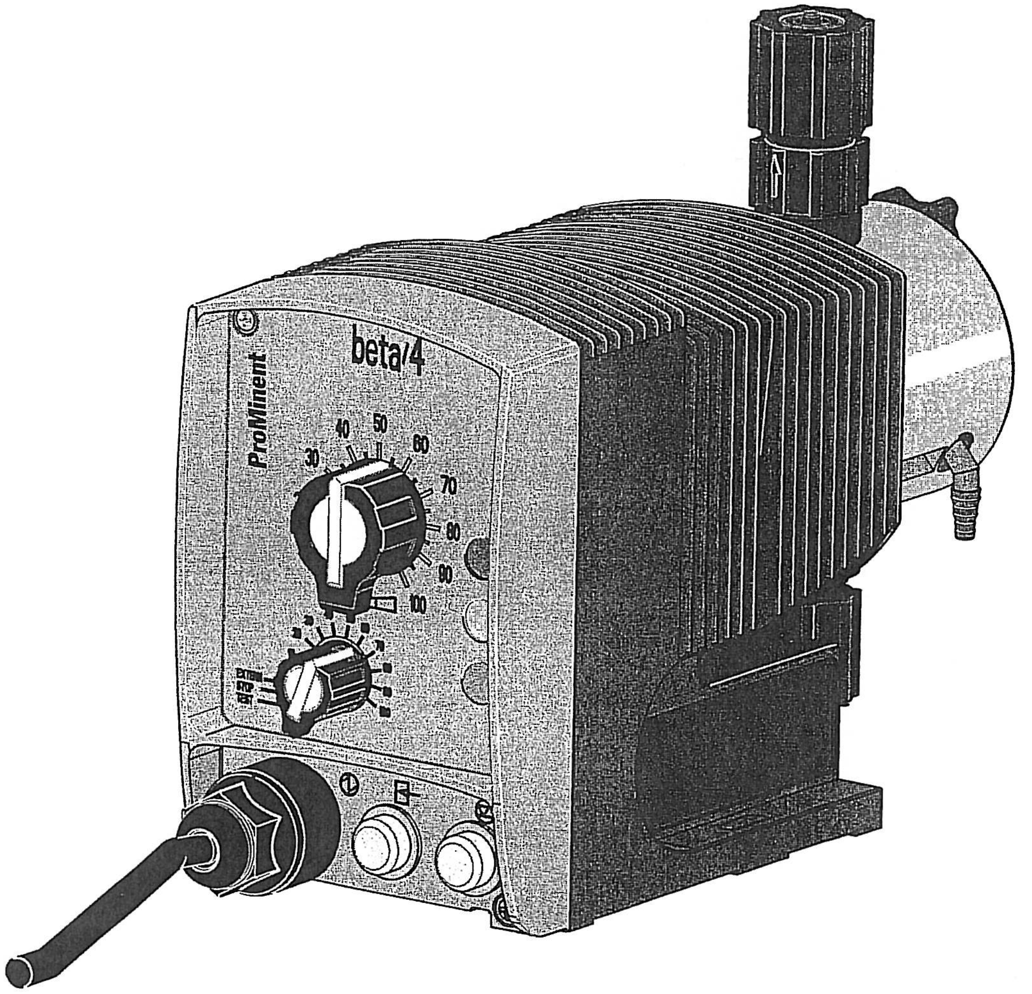
Gewicht/Eh.: 0,000 KG
weight

Techn.Kurztext: Anschlüsse : 2 x (6x4mm)
techn. description incl. 1 Stk. PP-Anschlußset 12 x 6 mm
texte abrégé techn.: Dosierleistung 9,9 L/h bei 3,5 bar bzw. 7,1 l/h
bei 7 bar bei max. 180 Hüben/Min.

Pos. Katalog-Nummer
pos. catalogue no.
numéro de catalogue
0020 0708 PPB 210AA000000
Bemerkung:

Adresse Name/Straße/Ort
address/name/street/place
adresse nom/rue/lieu
Pro Minent GmbH
Im Schuhmachergewann 7-11
Heidelberg +

Operating Instructions Manual
Solenoid Dosing Pump
ProMinent® Beta®
BT4a and BT5a


beta/4
ProMinent
30
40
50
60
70
80
90
100
EXTERN
STOP
TEST

BT4A _

BT5A _

Please enter ident code of the device here.

Please read the Operating Instructions manual through completely before commissioning this equipment.
Do not discard! Any part which has been subject to misuse is excluded from the warranty!

Part No. 987871
ProMinent Dosiertechnik GmbH · 69123 Heidelberg · Germany
BA BE 017 03/05 GB

Major Components

1 Control unit

1a Stroke length adjustment knob
1b Red LED display, fault indicator
1c Yellow LED display, warning indicator
1d Green LED display, operating status
1e Multifunction switch
1f Mains connector
1g External operating terminal
1h Float switch connector

2 Power end

2a Relay insertion point
2b Optional relay

3 Liquid end

3.1 Liquid end without bleed valve, with/without valve spring
3.2 Liquid end without bleed valve, with/without valve spring
3.3 Liquid end with bleed valve, with/without valve spring (PP-version)
3.4 Liquid end with bleed valve, with/without valve spring (NP-version)
3.5 Self-degassing liquid end

3a Liquid end back plate
3b Liquid end
3c Suction connection
3d Discharge connection
3e Bleed valve connection (self degassing liquid ends)
3f Bleeding/fine bleeding valve
3g Bypass tubing nozzle

General User Information:

This operating instructions manual contains the product descriptions in the main text.

- main points
- ➤ instructions

and safety information are indicated by pictograms:

WARNING
Ignoring safety information can endanger life or result in serious injury!

CAUTION
Ignoring safety information can result in injury to persons or damage to machinery or other materials!

IMPORTANT
Ignoring safety information can result in damage to machinery or other materials!

NOTE
Working guidelines.

Illustrated views of Beta®

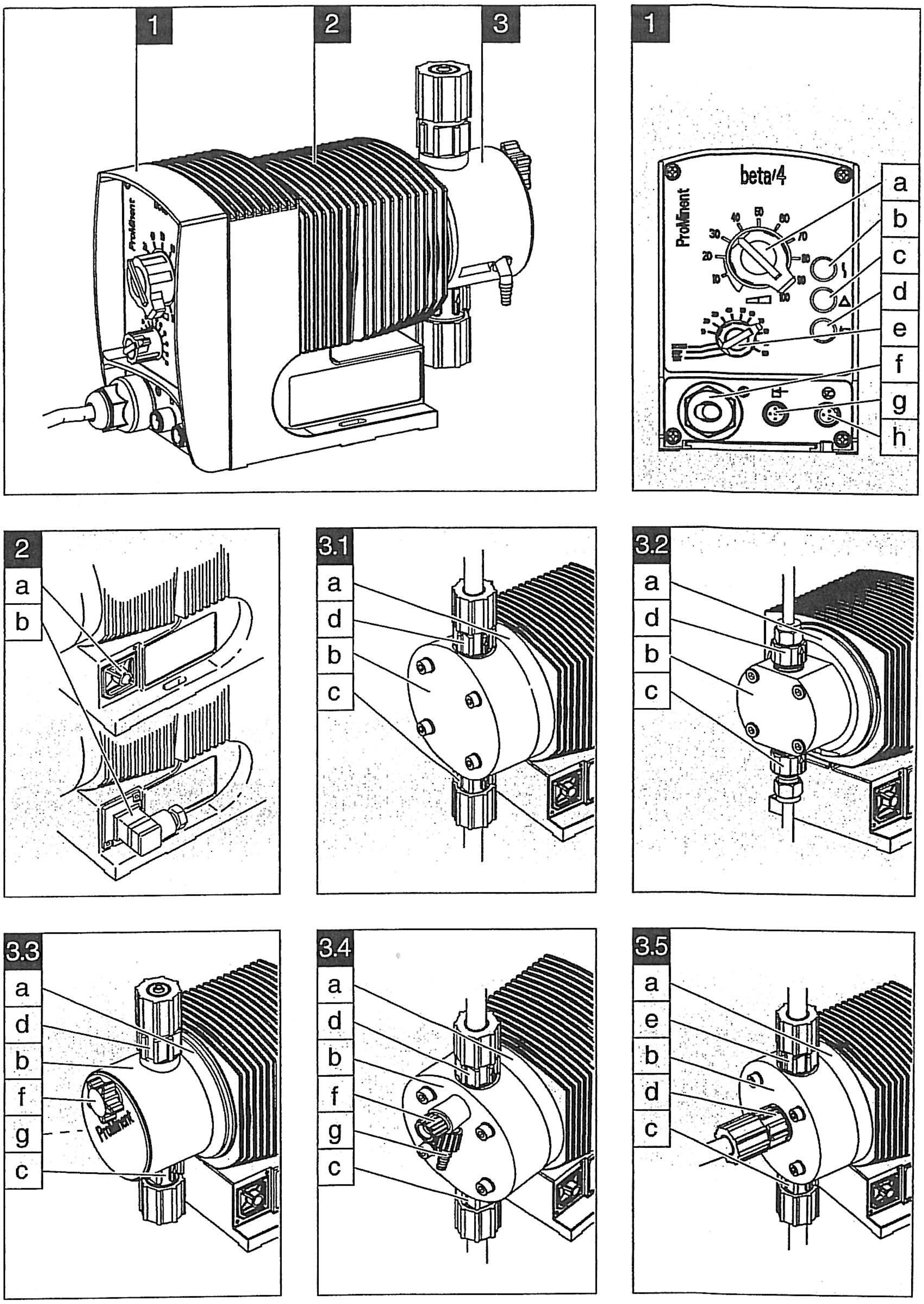

1
2
3
ProMinent
1
beta/4
ProMinent
a
b
c
d
e
f
g
h
2
a
b
3.1
a
d
b
c
3.2
a
d
b
c
3.3
a
d
b
f
g
c
ProMinent
3.4
a
d
b
f
g
c
3.5
a
e
b
d
c

Fig. 01

Publishing details:
Operating Instructions for Solenoid Dosing Pump ProMinent® Beta®
© ProMinent Dosiertechnik GmbH, 1998

Address:
ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Germany
info@prominent.com
www.prominent.com

Subject to technical modifications

Page

1 Application 4
2 Safety 4
  2.1 Safety Guidelines 4
  2.2 Sound intensity level 5
  2.3 Directives and Standards 5
  2.4 Testing and Permits 5
  2.5 EC Declaration of Conformity 6
3 Design and Function 7
4 Technical Data 8
  4.1 Ident Code 8
  4.2 Sizes and Weights 9
  4.3 Capacity Data 12
  4.4 Reproducibility 14
  4.5 Viscosity 14
  4.6 Materials Information 14
  4.7 Electrical Data 14
  4.8 Environmental Conditions 15
5 Removal of Packaging 16
6 Electrical Installation 16
7 Operation and Settings 18
  7.1 Operating Components and Functions 18
  7.2 Beta® Relay Retrofit Kit 20
8 Maintenance 24
9 Repairs 24
10 Troubleshooting 29
11 Decommissioning, Dismantling and Disposal 29
Appendix: 30
  Exploded diagrams of liquid ends 30

1 Application

The pumps in the ProMinent® Beta® series are microprocessor controlled solenoid metering pumps.

Liquid media They offer highly accurate reproducible metering in the dosing of liquid chemicals in pressurised pipe systems and into open and closed containers.

Compatibility Specified components/accessories in the Beta® pump series are compatible with those in the CONCEPT, gamma-Classic and gamma series as follows:

- Signal cable: gamma/Vario two core, and four core for "external" function
- Two stage float switch (gamma/Vario)
- gamma discharge line
- Standard gamma connector set
- gamma wall mounting bracket
- Feed container and fixing plates
- Total height (distance between suction and discharge line connectors)
- Distance between the connectors and mounting holes on the pump
- Identical accessories used, e.g. back pressure valves, multifunction valves and flushing apparatus.

Correct use of equipment

- The Beta® may be used only to meter liquids.
- The pump is not designed for use with gaseous chemicals or suspended solids.
- Take care when using aggressive chemicals that the materials used in the pump are resistant to those chemicals (see ProMinent® Chemical Resistance List in the product catalogue or under www.prominent.com).
- All other applications or modifications are prohibited.
- The pump may only be used for applications which correspond to the technical data and specifications described in the operating instructions manual.
- The pump is not designed for use in explosion-hazardous locations.
- The Beta® should be operated by suitably trained and authorised personnel only.

2 Safety

2.1 Safety Guidelines

WARNING

- **In emergencies the pump should be switched off immediately! Disconnect the power cable from the power supply!**
- **Do not dispatch pumps which are designed for use with radioactive chemicals!**
- **When using pumps with flammable chemicals, observe the relevant regulations concerning the transport and storage of flammable fluids (Ex, Vo, Vb F)!**
- **When installing outside Germany, always observe relevant national regulations!**
- **Combining ProMinent® metering pumps with parts not approved and tested by ProMinent is not permissible. It can cause injury or damage to persons or materials for which we cannot accept liability!**

CAUTION

- **Pumps must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!**
- **The pumps and peripherals must be serviced and repaired by qualified and authorised persons only!**
- **Always de-pressurise the liquid end prior to working on a pump!**
- **Empty and rinse the liquid end before working on a pump which has been used with hazardous or unknown chemicals!**
- **Always read chemical safety data!**
- **Always wear protective clothing when handling hazardous or unknown chemicals!**

2.2 Sound intensity level

The sound intensity level is < 70 dB (A) at maximum stroke, maximum stroke rate, maximum back pressure (water) in accordance with
DIN EN 12639 (Metering Pump Noise Measurement)

2.3 Directives and Standards (in addition to EC Declaration of Conformity)

EU Directives

The pump range conforms to the following EU Guidelines:
EU Machine directives 89/392/EWG, 91/368/EWG, 93/44/EWG
EU Low Voltage directives (73/23/EWG)
EU EMV directives (89/336/EWG) i. d. F. 92/31/EWG

Harmonised EN Standards

EN 61000-3-2	EMV Limit Values for High Voltage Currents
EN 61000-3-3	EMV Limit Values for Voltage Fluctuation and Flicker
EN 60950	The safety of information technology equipment including electrical office equipment (universal version 90–253 V AC)

Related National and international Norms

DIN VDE 0700 T 500

Identical to above EU standards:

IEC 1000-3-2	EMV Limit Values for High Voltage Currents
IEC 1000-3-3	EMV Limit Values for Voltage Fluctuation and Flicker

Include for packaging, delivery and transport:

DIN EN IEC 60068	”Environmental Testing“
DIN EN 22248	”Drop Testing“

”Notes for the testing of packaging for postal delivery“

For manufacture and delivery in the USA and Canada include:

CSA Standard C 22.2 No. 0-M91 ”General Requirements“
UL 950, IEC 950, CSA 1950. Corresponds to EN 60950

2.4 Testing and Permits

Certification and authorisation of system

The system carries the following authorisation:
For Germany: TÜV-GS
For USA and Canada: CSA, UL
System meets all requirements of CE symbol.

Certification and authorisation of integral components

The components used in the system carry the same authorisation as the whole system described above.

2.5 EC Declaration of Conformity

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Metering pump, series Beta /_a***
Product type :	***BT4a .... , BT5a ....***
Serial number :	***see type identification plate on device***
Relevant EC directives :	***EC - machine directive 98/37/EC*** ***EC - low voltage directive 73/23/EEC*** ***EC - EMC - directive (89/336/EEC) subsequently 92/31 EEC***
Harmonised standards used, in particular :	***DIN EN 292-1, DIN EN 292-2, DIN EN 809*** ***DIN EN 60335-1, DIN EN 60335-2-41, DIN EN 50106*** ***DIN EN 50081-1/2, DIN EN 55014, DIN EN 60555-2/3*** ***DIN EN 50082-1/2, DIN EN 61000-4-2/3/4/5/6/8/11***
National standards and other technical specifications used, in particular :	***VDE 0700 T1*** ***VDE 0700 T41*** ***VDE 0700 T500*** ***IEC 1000-3-3, IEC 1000-4-2/3/4/5/6/11*** ***CSA Standard C22.2 No.108-M89 (115Vu. 230V USA)*** ***UL Standard 778 (115V u. 230V USA)***
Date/manufacturer´s signature :	***June 5, 2001***
The undersigned :	*Dr.Rainer V. Dulger, Executive Vice President R&D and Production*

3 Design and Function

Main components

Operating panel
Power end
Liquid end

Operating Principle

Chemical feed occurs as a result of pulsed deflections of the dosing diaphragm within the liquid end, which causes pressure differentiation between the suction side, the liquid end cavity and the discharge side. The pressure differentiation causes the suction and discharge self-acting valves to open and close, resulting in chemical feed.

The dosing diaphragm is driven by an electromagnet, which is stimulated and controlled by a microprocessor.

Pump Capacity

The feed rate is determined by the stroke length and stroking rate.

The stroke length is adjustable between 0 % and 100 % using the stroke length adjustment knob. However reproducibility is only technically practicable in the adjustment range of between 30 % and 100 %.

Stroking rate is adjustable in 10 % steps between 0 % and 100 % using the multifunction switch. This gives a higher rate of reproducible metering accuracy.

Operating Modes

Operating modes are selected using the multifunction switch.

Three LED displays indicate operating and fault status.

Internal operating mode: "Manual":

Stroking rate is manually adjustable in 10 % steps via the multifunction switch.

"External" operating mode:

Allows adjustment of individual strokes via the external operating mode terminal by means of contact or semi-operating devices.

Functions

"Auxiliary Frequency" function:

Enables activation of optionally selectable and programmable stroking rate, controlled via the external operating mode terminal. This stroking rate overrides "Manual" and "External" operating modes.
In the standard version the "Auxiliary Frequency" function is programmed to 100 % stroking rate.

"Pause" function:

The external operating terminal can be used to operate a remote pump stop function.

"Stop" function:

This function allows the pump to be deactivated without disconnecting from the power supply.

"Test" function:

This function checks the priming function of the pump. The switch setting "Test" on the multifunction switch is self-locking.

Self-degassing

Self-degassing metering pumps are used in closed discharge lines to create suction and to direct trapped air to bypass lines, and/or remove gas emitted by gaseous chemicals during operation, independently of existing back pressure.
Installing a back pressure valve ensures precise chemical feed can be achieved, even when operating under atmospheric pressure.

Options

The float switch connector can be used to connect a two stage float switch.
There is also optionally available a relay terminal for an alarm indicating relay, and a switch output which is synchronised to each stroke.

4 Technical Data

4.1 Identcode

Please enter the identcode on the device label into the grey box below.

Series	Type	
BT4A	1000, 1601, 1602, 1005, 0708, 0413, 0220	☐ Custom version ....
BT5A	1605, 1008, 0713, 0420, 0232	

Material		
PP	Polypropylene	☐ Custom version ....
NP	Acrylic/PVC	
PV	PVDF	
TT	PTFE with carbon	
SS	stainless steel	

Diaphragm and Seal		
E	standard with EPDM seals	☐ Custom version ....
B	standard with FPM seals	
T	standard with PTFE flat seals	

Liquid end Version		
0	no bleed valve, no valve springs	☐ Custom version ....
1	no bleed valve, with valve springs	
2	with bleed valve, no valve springs for PP, NP and PV only	
3	with bleed valve, with valve springs for PP only	
4	no-vent with valve springs for highly viscous media	
9	self-degassing for PP and NP	

Hydraulic Connections		
0	standard connections	☐ Custom version ....

Version		
0	with ProMinent® logo	☐ Custom version ....

Electrical Connections		
A	200–230 V, ±10 %	☐
B	100–115 V, ±10 %	
U	100–230 V, ±10 %	
M	12....24 V DC (only BT4a)	Custom version
N	24 V DC (only BT5a)	....
P	24 V AC	

Cable and Plug		
A	2 m European	☐ Custom version ....
B	2 m Swiss	
C	2 m Australian	
D	2 m USA	
1	2 m open end	

Relay	
0	no relay
1	fault indicating relay (N/C)
3	fault indicating relay (N/O)
4	as 1 + pacing relay
5	as 3 + pacing relay
	☐ Custom version ....

Accessories	
0	no accessories
1	with foot and delivery valve, 2 m PVC tubing, 5 m PE tubing
	☐ Custom version ....

Control type	
0	no lock
1	with lock; manual operation locked when external cable plugged in

Options on request		Custom version
0	no options	☐ ....
0	no options	☐ ....
0	no options	☐ ....
0	no options	☐ ....

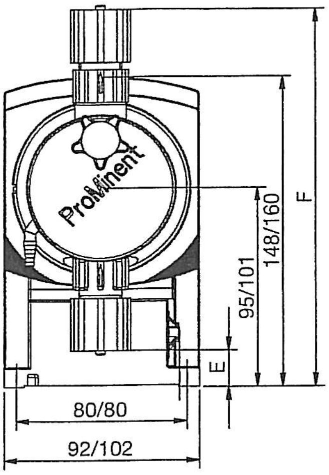
_ _

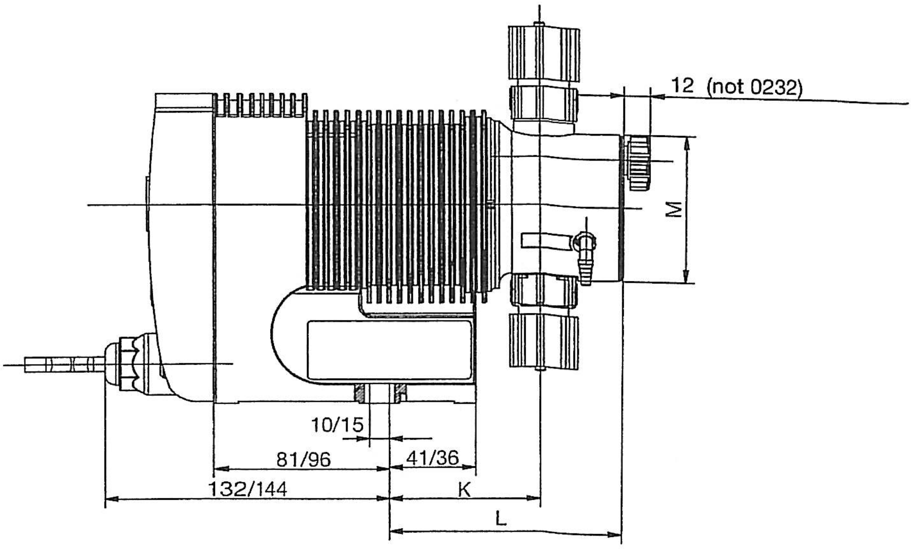
FPM = Fluorine Rubber

Fig. 02

4.2 Sizes and Weights

Materials option: PP

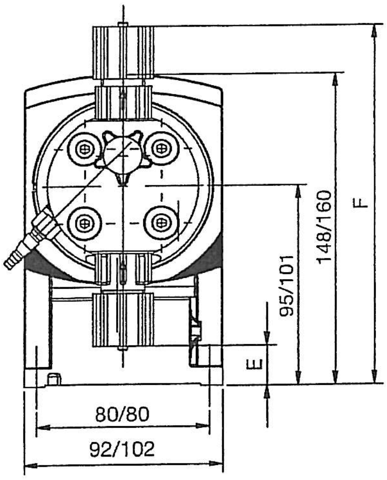

ProMinent
80/80
92/102
E
95/101
148/160
F

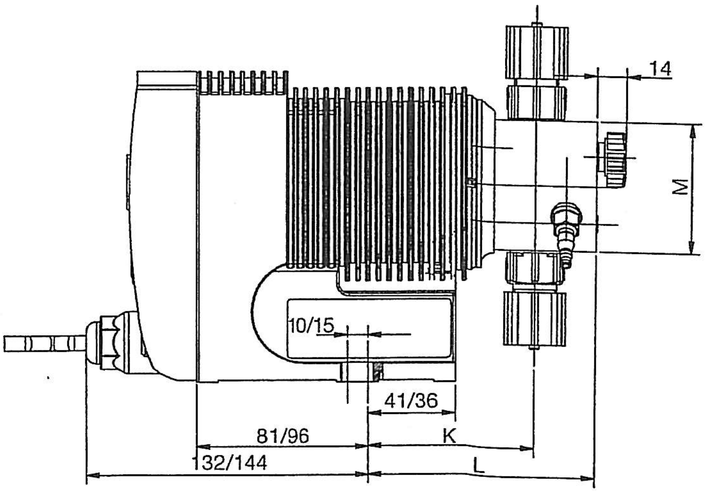

12 (not 0232)
M
10/15
81/96
41/36
132/144
K
L

Dimensions Beta®/ 4 / Beta®/ 5

	Beta®/ 4				Beta®/ 5			
	1000 – 1602	**1005**	**0708 – 0413**	**0220**	**1605**	**1008 – 0713**	**0420**	**0232**
E	17	7	9	9	13	15	15	5
F	180	187	185	185	193	191	191	197
K	71	71	74	76	71	74	76	76
L	106	105	108	110	105	108	110	91
M	Ø 70	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Materials option: NP

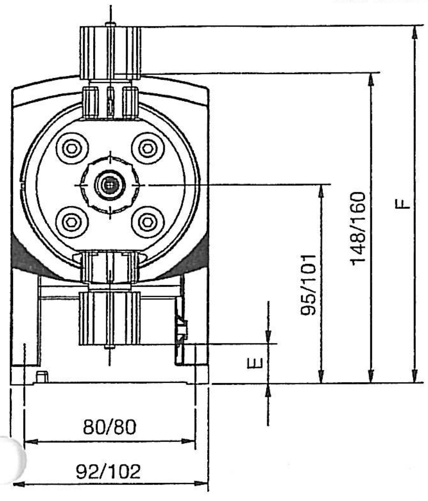

80/80
92/102
E
95/101
148/160
F

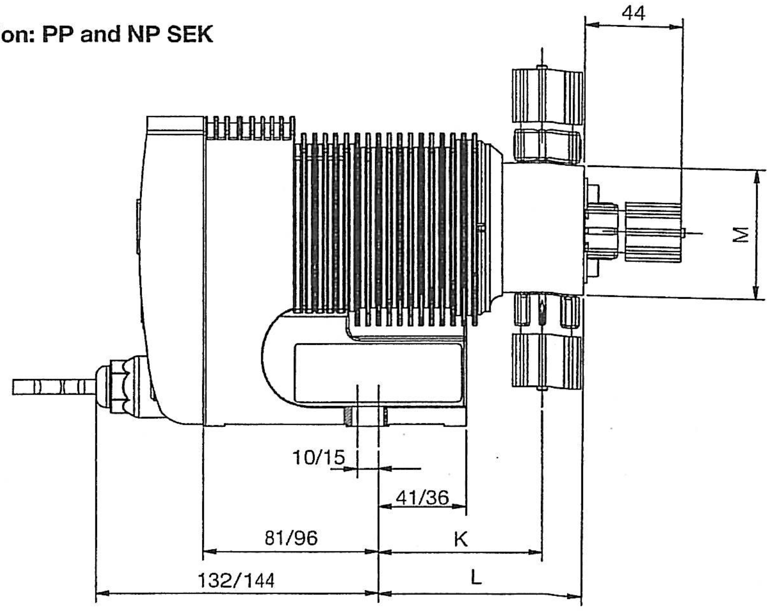

14
M
10/15
41/36
81/96
K
132/144
L

Dimensions Beta®/ 4 / Beta®/ 5

	Beta®/ 4					Beta®/ 5			
	1000 – 1601	**1602**	**1005**	**0708**	**0413 – 0220**	**1605**	**1008**	**0713 – 0420**	**0232**
E	19	17	10	9	9	16	15	15	5
F	171	173	180	181	181	186	187	187	197
K	77	77	74	74	76	74	74	76	76
L	105	105	102	102	104	102	102	104	91
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Materials option: PP and NP SEK

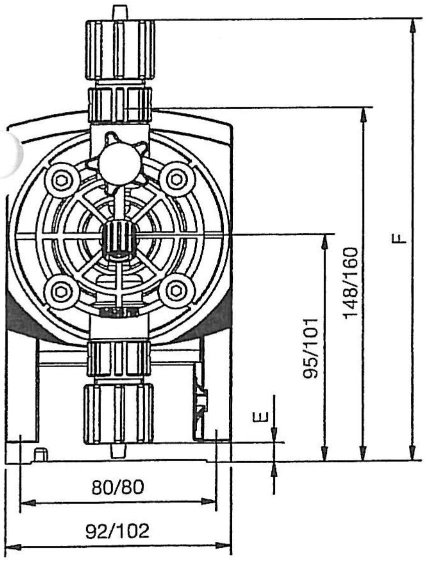

F
148/160
95/101
E
80/80
92/102

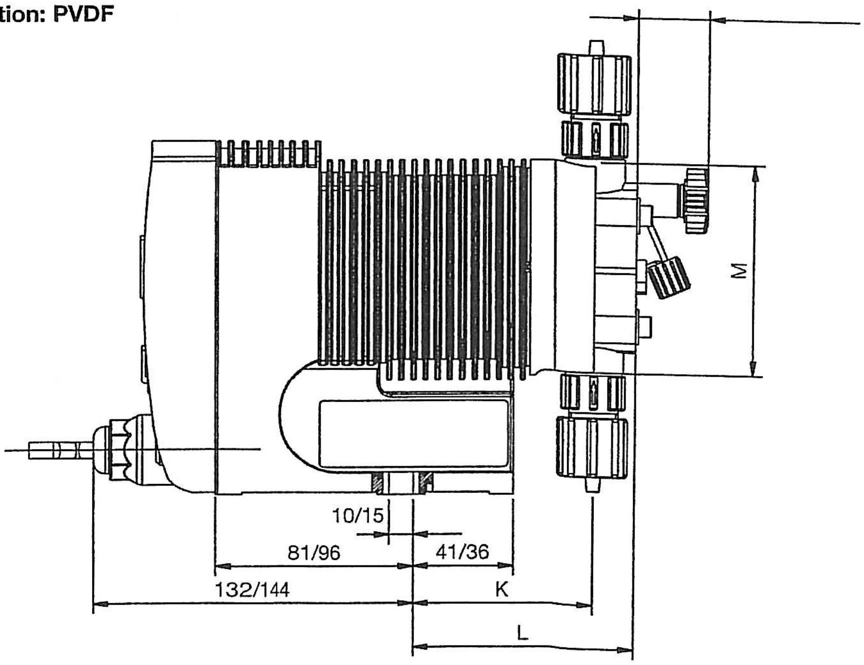

44
M
10/15
41/36
81/96
K
132/144
L

Dimensions Beta®/ 4 / Beta®/ 5

	Beta®/ 4					Beta®/ 5		
	1601 – 1602	1602	1005	0708	0413 – 0220	1605	1008	0713 – 0420
E	19	17	10	9	9	16	15	15
F	171	173	180	181	181	186	187	187
K	77	77	74	74	76	74	74	76
L	92	92	89	89	91	89	89	91
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90

Materials option: PVDF

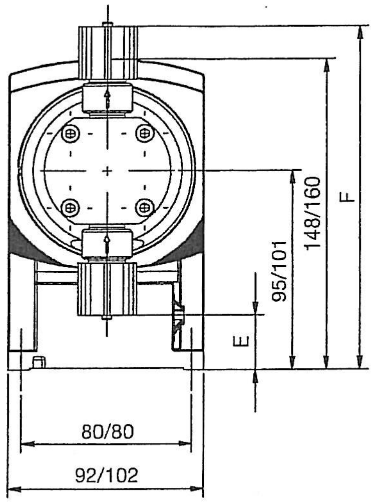

F
148/160
95/101
E
80/80
92/102

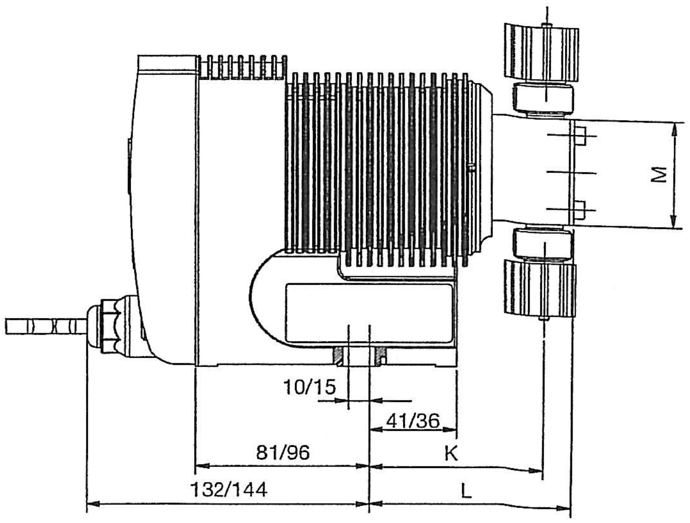

M
10/15
81/96
41/36
132/144
K
L

Dimensions Beta®/ 4 / Beta®/ 5

	1000-1602	1005	0708-0413	0220	1605	0408-0713	0420	0232
E	19	8	8	8	14	14	14	4
F	179	185	185	185	191	191	191	198
K	71	71	73	75	71	73	75	76
L	84	88	90	92	88	90	92	93
M	Ø 70	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

Materials option: TT

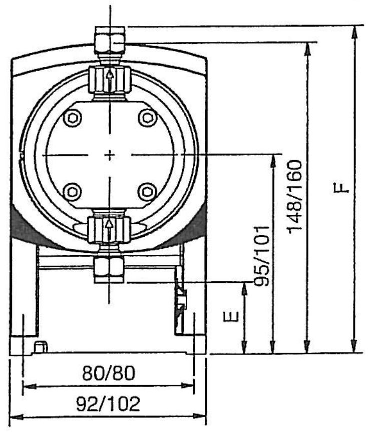

148/160
F
95/101
E
80/80
92/102

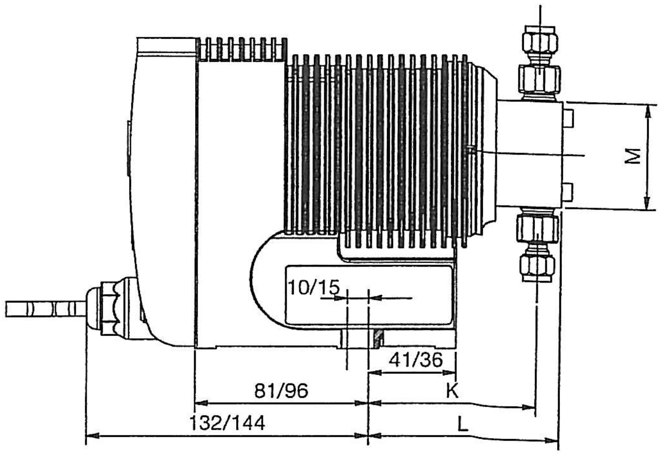

M
10/15
41/36
81/96
K
132/144
L

Dimensions Beta®/ 4 / Beta®/ 5

	Beta®/ 4				Beta®/ 5		
	1000 – 1601	**1602**	**1005**	**0708 – 0220**	**1605**	**1008 – 0420**	**0232**
E	26	19	17	-13	23	-7	-15
F	164	172	173	203	179	209	217
K	78	72	75	77	75	77	78
L	91	91	90	95	90	95	95
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	68 (Ø 80)	81 (Ø 85)	96 (Ø 100)

Materials option: SS


148/160
F
95/101
E
80/80
92/102


M
10/15
41/36
81/96
K
132/144
L

Dimensions Beta®/ 4 / Beta®/ 5

	Beta®/ 4					Beta®/ 5			
	1000 – 1601	**1602**	**1005**	**0708 – 0413**	**0220**	**1605**	**1008 – 0713**	**0420**	**0232**
E	34	27	25	-8	-9	31	-2	-3	-10
F	156	164	165	198	199	171	203	204	212
K	78	72	75	77	77	75	77	77	78
L	89	89	88	91	93	88	91	93	93
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	81 (Ø 85)	68 (Ø 80)	81 (Ø 85)	81 (Ø 85)	96 (Ø 100)

4.3 Capacity Data

Beta®/ 4 at 180 strokes/minute and 100 % stroke length

Pump type	Max. Pump capacity at maximum back pressure			Max. pump capacity at medium back pressure			Connector size oØ x iØ	Suction lift*	Priming lift**	Permissible admission pressure	Shipping weight PP, NP, PV, TT/SS
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	mm	m WG	m WG	bar	approx. kg
1000	10	0.74	0.07	5	0.82	0.076	6x4	6	1.8	8	2.9 / 3.6
0700	7	0.8	0.07	3.5	0.9	0.08	6x4	6	1.8	8	2.9 / 3.6
0400	4	0.84	0.08	2	1.1	0.105	6x4	6	1.8	8	2.9 / 3.6
1601	16	1.1	0.10	8	1.4	0.13	6x4	6	2.0	8	2.9 / 3.6
1001	10	1.3	0.12	5	1.5	0.14	6x4	6	2.0	8	2.9 / 3.6
0701	7	1.4	0.13	3.5	1.6	0.15	6x4	6	2.0	8	2.9 / 3.6
0401	4	1.5	0.14	2	2.3	0.21	6x4	6	2.0	8	2.9 / 3.6
1602	16	2.1	0.19	8	2.5	0.24	6x4	6	2.5	5.5	2.9 / 3.6
1002	10	2.4	0.22	5	2.8	0.25	6x4	6	2.5	5.5	2.9 / 3.6
0702	7	2.6	0.24	3.5	3.0	0.28	6x4	6	2.5	5.5	2.9 / 3.6
0402	4	2.8	0.26	2	4.0	0.37	6x4	6	2.5	5.5	2.9 / 3.6
1005	10	4.4	0.41	5	5.0	0.46	8x5****	5	3.0	3	3.1 / 4.5
0705	7	4.7	0.44	3.5	5.4	0.50	8x5****	5	3.0	3	3.1 / 4.5
0405	4	5.3	0.49	2	7.1	0.66	8x5****	6	3.0	3	3.1 / 4.5
0708	7	7.1	0.66	3.5	8.4	0.78	8x5	4	2.0	2	3.1 / 4.5
0408	4	8.3	0.77	2	10.6	0.98	8x5	4	2.0	2	3.1 / 4.5
0413	4	12.3	1.14	2	14.2	1.31	8x5	3	2.5	1.5	3.1 / 4.5
0220	2	19.0	1.76	1	20.9	1.94	12x9	2	2.0	1	3.1 / 4.5

Beta®/ *** - self-degassing types at 180 strokes/minute and 100 % stroke length

Pump type	Max. Pump capacity at maximum back pressure			Max. pump capacity at medium back pressure			Connector size oØ x iØ	Suction lift*	Priming lift**	Permissible admission pressure	Shipping weight PP, NP
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	mm	m WG	m WG	bar	approx. kg
1601	16	0.59	0.055	8	0.78	0.072	6x4	–	1.8	0.5	2.9
1001	10	0.72	0.067	5	0.84	0.078	6x4	–	1.8	0.5	2.9
0701	7	0.84	0.078	3.5	0.84	0.078	6x4	–	1.8	0.5	2.9
0401	4	0.9	0.083	2	1.02	0.09	6x4	–	1.8	0.5	2.9
1602	16	1.4	0.13	8	1.74	0.16	6x4	–	2.1	0.5	2.9
1002	10	1.7	0.16	5	2.0	0.18	6x4	–	2.1	0.5	2.9
0702	7	1.8	0.17	3.5	2.1	0.19	6x4	–	2.1	0.5	2.9
0402	4	2.1	0.19	2	2.2	0.20	6x4	–	2.1	0.5	2.9
1005	10	3.6	0.33	5	4.0	0.37	8x5	–	2.7	0.5	3.1
0705	7	3.9	0.36	3.5	4.3	0.40	8x5	–	2.7	0.5	3.1
0405	4	4.2	0.39	2	4.4	0.41	8x5	–	2.7	0.5	3.1
0708	7	6.6	0.61	3.5	7.5	0.69	8x5	–	2.0	0.5	3.1
0408	4	7.5	0.69	2	8.1	0.75	8x5	–	2.0	0.5	3.1
0413	4	10.8	1.00	2	12.6	1.17	8x5	–	2.5	0.5	3.1
0220	2	16.2	1.50	1	18.0	1.67	12x9	–	2.0	0.5	3.1

* Suction lift when suction line and liquid end are full.

** Priming lift when valves are clean and have been wetted. Intake head at 100 % stroke length and free run-off or vent valve open.

*** The feed rates are minimum feed rates and relat to water.

**** For 6 x 4 mm stainless steel version.

Beta®/ 5 at 180 strokes/minute and 100 % stroke length

Pump type	Max. Pump capacity at maximum back pressure			Max. pump capacity at medium back pressure			Connector size oØ x iØ	Suction lift*	Priming lift**	Permissible admission pressure	Shipping weight PP, NP, PV, TT/SS
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	mm	m WG	m WG	bar	approx. kg
1605	16	4.1	0.38	8	4.9	0.45	8x5****	4.0	3.0	3	4.5 / 5.9
1008	10	6.8	0.63	5	8.3	0.76	8x5	3.0	3.0	2	4.5 / 5.9
0713	7	11.0	1.02	3.5	13.1	1.21	8x5	3.0	3.0	1.5	4.5 / 5.9
0420	4	17.1	1.58	2	19.1	1.77	12x9	3.0	3.0	1	5.5 / 8.6
0232	2	32.0	2.96	1	36.2	3.35	12x9	2.0	2.0	0.8	5.5 / 8.6

Beta®/ 5*** - self-degassing types at 180 strokes/minute and 100 % stroke length

Pump type	Max. Pump capacity at maximum back pressure			Max. pump capacity at medium back pressure			Connector size oØ x iØ	Suction lift*	Priming lift**	Permissible admission pressure	Shipping weight PP, NP
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	mm	m WG	m WG	bar	approx. kg
1605	16	3.3	0.31	8	3.8	0.35	8x5	–	3.0	0.5	4.5
1008	10	6.3	0.58	5	7.5	0.69	8x5	–	3.0	0.5	4.5
0713	7	10.5	0.97	3.5	12.3	1.14	8x5	–	2.5	0.5	4.5
0420	4	15.6	1.44	2	17.4	1.61	12x9	–	2.5	0.5	4.5

* Suction lift when suction line and liquid end are full.

** Priming lift when valves are clean and have been wetted. Intake head at 100 % stroke length and free run-off or vent valve open.

*** The feed rates are minimum feed rates and relat to water at 20 °C.

**** For 6 x 4 mm stainless steel version.

4.4 Reproducibility

Reproducible metering accuracy –5 % to +10 % at max. stroke length and max. back pressure for versions in all materials.

Reproducibility ±2 % under constant conditions and at minimum 30 % stroke length.

As the self-bleeding pump is used with outgassing media and in application with gas-bubbles, the metering accuracy and reproducibility cannot be indicated.

The recommended min. stroke length for selfbleeding dosing pumps is 50 %.

4.5 Viscosity

The metering pumps are intended for use with liquids with a viscosity of up to:

- max. 200 mPas for standard liquid end
- max. 500 mPas for spring valves
- max. 50 mPas for self-degassing metering pumps.

4.6 Materials Information

Version	Liquid end	Valves	Seals	Valve Balls
PPE	Polypropylene	Polypropylene	EPDM	ceramic
PPB	Polypropylene	Polypropylene	FPM	ceramic
NPE	Acrylic	PVC	EPDM	ceramic
NPB	Acrylic	PVC	FPM	ceramic
PVT	PVDF	PTFE with carbon	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	stainless steel No. 1.4571	stainless steel No. 1.4571	PTFE	ceramic

FPM = Fluorine Rubber

4.7 Electrical Data

- Version: 200-230 V ±10 %, 50/60 Hz

230 V/AC Version	Beta®/ 4	Beta®/ 5
Nominal capacity:	17 W	22 W
Peak current:	1.2 A	2.8 A
Peak switching current:	15 A for < 1 ms	15 A for < 1 ms
Fuse:	0.8 AT	0.8 AT

- Version: 100-115 V ±10 %, 50/60 Hz

115 V/AC Version	Beta®/ 4	Beta®/ 5
Nominal capacity:	17 W	22 W
Peak current:	4.0 A	6.5 A
Peak switching current:	15 A for < 1 ms	15 A for < 1 ms
Fuse:	0.8 AT	0.8 AT

- Version: 100-230 V ±10 %, 50/60 Hz

100-230 V/AC Version	Beta®/ 4	Beta®/ 5
Nominal capacity:	17 W	22 W
Peak current:	4.2 - 1.3 A	5.9 - 2.3 A
Peak switching current:	15 A for < 1 ms	15 A for < 1 ms
Fuse:	0.8 AT	0.8 AT

Note Only use fuses carrying VDE, UL and CSA authorisation, e.g. type 19195 from Fa. Wickmann as given in IEC publication 127 - 2/3.

4.8 Environmental Conditions

Temperatures Storage and transport temperature: –10 °C ... +50 °C

Maximum dosing media temperatures depending on material:

Material Type:	PP	PVC	Acrylic	PVDF	PTFE	Stainless steel
Permissible temperature continuous operation at max. back pressure:	50 °C	45 °C*	45 °C	50 °C	50 °C	50 °C
Permissible temperature short term, max. 15 min. operation at max. back pressure of 2 bar:	100 °C	60 °C	60 °C	120 °C	120 °C	120 °C
Minimum dosing media temperature:	-10°C					
ambient temperature during operation:	-10 through +45°C*					

*for material acrylic glass

Under extreme conditions such as max. medium temperature, max. stroke rate and max. backpressure leaks may occur at the liquid end at ambient temperatures above 35 °C.

Climate	Permissible relative humidity:	92 % non-condensing
	Corresponding to humidity and fluctuations in climate:	FW 24 according to DIN 50016
Enclosure rating	Contact and humidity enclosure:	IP 65 according to IEC 529, EN 60529, DIN VDE 0470 part 1
Noise level	Noise level:	< 70 dB(A) within 1 m distance according to EN 12639
Electrical safety requirements	Safety class 1 – mains connector with earth lead	

5 Removal of Packaging

Removal of packaging

▶ Retain the packaging. It can be used to return the pump in case of repair or for guarantee purposes.

▶ Compare delivery note with contents of packaging.

▶ Check that the details given on the metering pump device label correspond with your ordering details!

▶ Should you experience any problems, contact your ProMinent branch or supplier!

▶ Give the identity code and serial number, which you will find on the device label, in the event of goods returns or when ordering replacement parts. This will ensure correct identification of the pump type and material version.

Included in Delivery

- Metering pump with mains cable
- Operating instructions manual with conformity declaration, with accessories if applicable

6 Electrical Installation

WARNING

- **WARNING – Risk of electric shock – This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounding-type receptacle.**
- **Observe the relevant national regulations when installing the pump outside Germany!**
- **Do not connect power supply to external terminals!**
- **Make sure that the power supply corresponds to the details on the device label! When connecting in parallel with inductive consumers a separate switch contact, e.g. relay or coutactor should be fitted!**

IMPORTANT

- **The universal signal cable, the external/contact cable and the liquid level monitoring cable may not be less than 1.20 m. Cable recognition will otherwise be lost.**

Mains connection

The pump is connected via the fixed mains cable to the correct power supply.

ON/Off switching

The pump should only be able to be disconnected from the power by

- removing the plug from the socket
- via the "stop" setting on the multifunction switch
- remote stop via an external cable (see 7.1).

Connecting in parallel

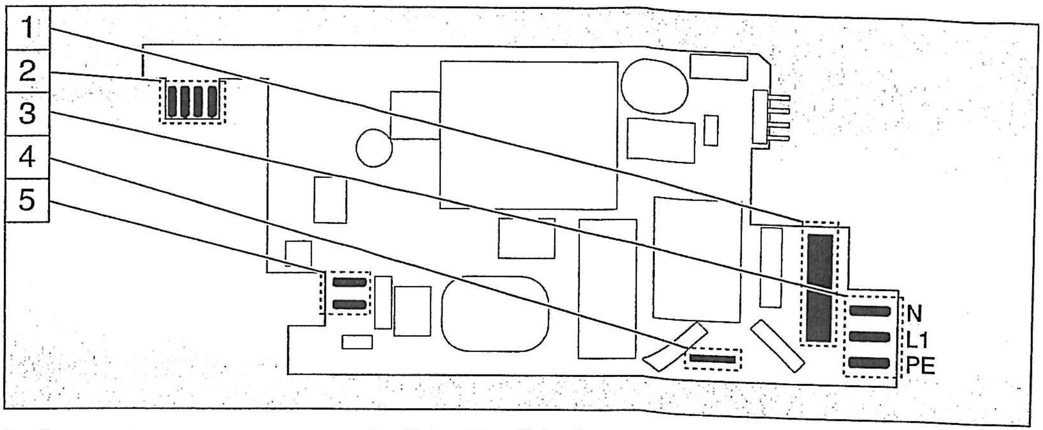
If the pump is connected to the power in parallel with inductive consumers, e.g. (solenoid valve, motor), they must be electrically isolated from these items to prevent damage from induction voltages when switching off.

▶ Fit separate contacts, power supply via contacter relay or relay.

If this is not possible, then:

▶ Parallel connection via varistor (order number 710912) or an RC circuit (0.22 µF/220 Ω, order number 710802).

Leistungsteil (im Pumpenfuß)



1 Fuse
2 Optional relay connector
3 Mains connector
4 Solenoid earth lead
5 Solenoid connector

Fig. 06

Option fault indicating relay

Contact	VDE-cable	CSA-cable
NO	white	white
NC	green	red
C	brown	black

Option fault indicating and pacing relay

Contact	VDE-cable	CSA-cable
NO (fault indicating relay)	yellow	–
C (fault indicating relay)	green	–
NO (pacing relay)	white	–
C (pacing relay)	brown	–

7 Operation and Settings

7.1 Operating Components and Functions

Stroke length adjustment knob The stroke length is continuously adjustable between 0 % and 100 % via the stroke length adjustment knob. Reproducibility is only technically practicable in the adjustment range of between 30 % and 100 % however.

Multifunction switch The multifunction switch (1e) is used to select the operating mode and to set the stroking rate. The following operating modes are selected using the multifunction switch:
- Stop
- External
- Manual (to set stroking rate in 10 % steps)
- Test (priming suction function)

External operating terminal The "terminal for external operating" is a five channel connector. It is compatible with two and four channel signal cables used previously. The "auxiliary frequency" function can be used only with the five channel cable, however.

Pump configuration

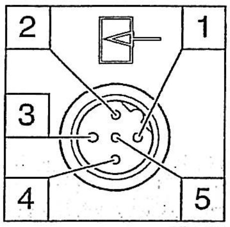


Fig. 07

Electrical Interface:
- Open contact voltage: approx. +5 V
- Input resistance: 10 kΩ
- Control: volt free contact (0.5 mA at +5 V).
  or: semi conductor switch (residual voltage < 0.7 V)
- minimum contact duration: ≥ 20 ms

Plug configuration

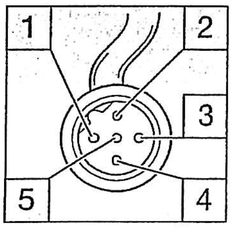


Fig. 08

Function		**2channel cable**	**4channel cable**	**5channel cable**
pin 1	pause	bridge to pin 4	brown	brown
pin 2	external	brown	white	white
pin 3	not configured	–	blue	blue
pin 4	reference potential earth)	white	black	black
pin 5	auxiliary frequency	–	–	grey

"Pause" Function

The pump runs when
- There is no cable connected (e.g. pin 1 free)
- The cable is connected and the contact is earthed (pins 1 and 4 connected).

The pump does not run when
- The cable is connected and the contact is open (pins 1 and 4 not connected).

"External" Operating Mode

A dosing stroke is triggered when a contact is made for a minimum of 20 ms with pin 2 (external) and pin 4 (earth), and the "pause" input is at pin 4 (earth).

Operating Characteristic Variations: Changing from "External" to "Manual"

The operation of the Beta® pump when changing from "external" to "manual" options (when external cable is connected) takes two forms:

Identity code: "control type"
- 0: no lock
  "External" and "manual" operating modes can be activated at any time. All pump functions correspond to the texts on the multifunction switch and the pre set operating mode. The pump operates in "manual" mode even when external cable is connected. This is the standard version.
- 1: with lock
  The "external" operating mode is only available when external cable is connected.
  The "manual" function is only available when the cable is removed.

Altering External Frequency Function (Auxiliary Frequency)

This function switches the pump over to a pre-programmed frequency, as long as the correct input is connected to pin 4 (reference potential) and the pump is not in "pause" or "stop" modes. The "auxiliary frequency" function overrides a manually set operating frequency and also "external" operating mode.

If the "auxiliary frequency" function and the "pause" function are both active the pump stops. In the standard version this function is programmed to 100 % stroking rate.

Connecting float switch

It is possible to fit a two stage float switch to activate early warning and limit switch functions.

Pump configuration

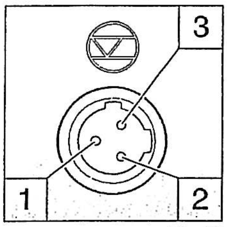


Fig. 09

Electrical Interface:
- Open contact voltage: approx. +5 V
- Input resistance: 10 kΩ
- Control: volt free contact (0.5 mA at +5 V).

or: semi conductor switch (residual voltage < 0.7 V)

Plug configuration

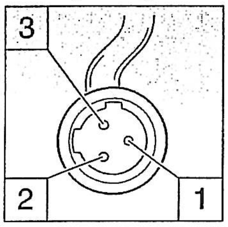


Fig. 10

Function		**3channel cable**
pin 1	reference potential (earth)	black
pin 2	minimum warning indication	blue
pin 3	minimum fault (switches off)	brown

Function and fault indicators

A signal is sent to the pump (minimum warning or minimum fault) when the liquid level in the chemical feed tank drops below specific levels.

Three LED displays act as the function and fault indicators.

Green LED indicator, operating display

This LED illuminates briefly when a discharge stroke is activated.

Yellow LED indicator, warning indicator

This LED lights up when the liquid level drops below the first float switch triggering level.

Red LED indicator, fault indicator

This LED lights up when liquid levels reach the fault indicating level (20 mm remaining in chemical feed tank)

It also flashes to indicate undefined operating status.

Relay

Relay output, fault indicating

An optional fault indicating relay is available to order.
It is used to relay processor fault and "level fault" signals.
The selection of NC/NO relay status is indicated by the identity code. The basic setting is as NC.
The basic version can be retrofitted, and is ready to operate after plugging in relays.
The connector cable is plugged in.

Electrical interface:
- Contact load: 250 V/2 A 50/60 Hz
- Operating life: > 200.000 switch functions

VDE cable	CSA cable	Contact
white	white	NO (normally open)
green	red	NC (normally closed)
brown	black	C (common)

Fault signal output and pacing signal output

Two semi conductor switches are available to order as signal output and pacing relay.
These outputs are electrically isolated by optical couplers.
The pulse output of the pump drives an open collector transistor interfaced to the input device.
This option may be retrofitted, the connector cable is plugged in.

Electrical interface:

For semi-conductor switch
- Residual voltage: < 0.4 Volt at I_c = 1 mA
- Maximum current: < 100 mA
- Max. voltage: 24 V DC
- Pacing relay pulse length approx. 100 ms

For relay output
- Contact load: 24 V/100 mA 50/60 Hz
- Operating life: > 200.000 switch functions

VDE cable	Contact	Relay
yellow	NO (normally open)	Fault indicating relay
green	C (common)	Fault indicating relay
white	NO (normally open)	Pacing relay
brown	C (common)	Pacing relay

7.2 Beta® Relay Retrofit Kit

Part No. 1002526 - Alarm relay Beta®

Part No. 1002528 - Alarm and pacing relay Beta®

1 complete relay board with 2 fastening screws
2 additional fastening screws
1 complete relay cable with socket
1 seal

Press-out relay opening

WARNING

Disconnect Beta® from the mains power supply and rinse liquid end before commencing work!

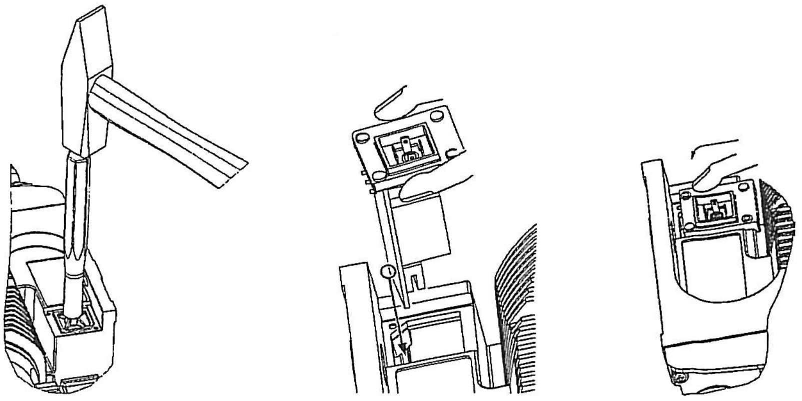
IMPORTANT

When preparing the opening, ensure that the punch is not forced through the entire pump base!
Pump circuits may become damaged.

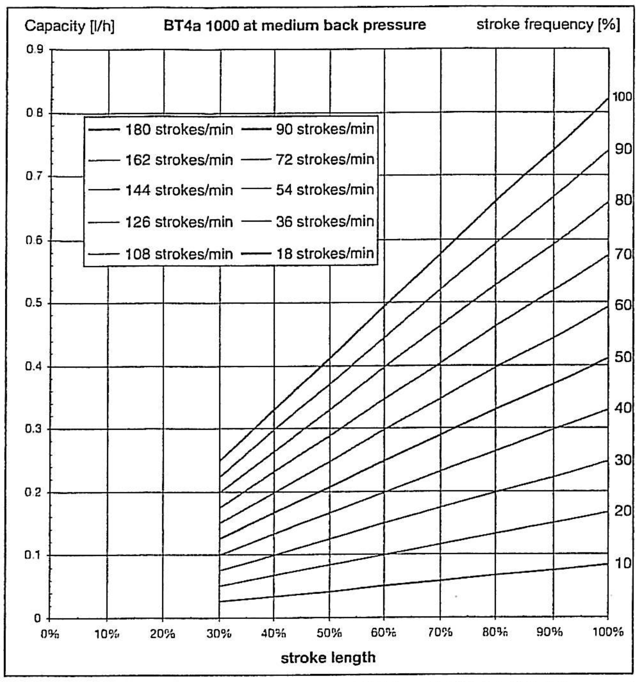
- ▶ Place the Beta® on a firm surface with the relay opening press-out section at the top. (see fig. 11a)
- ▶ Place a punch (dia. 8-15 mm) in the centre of the relay opening press-out section, and strike briefly and sharply with a hammer (approx. 250 g).
- ▶ If necessary clean up the edges of the opening.
- ▶ Remove the pressed out section from the Beta®.

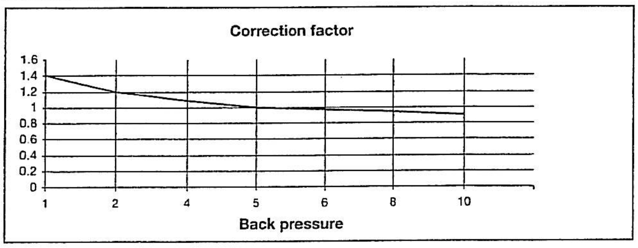
Inserting the relay component

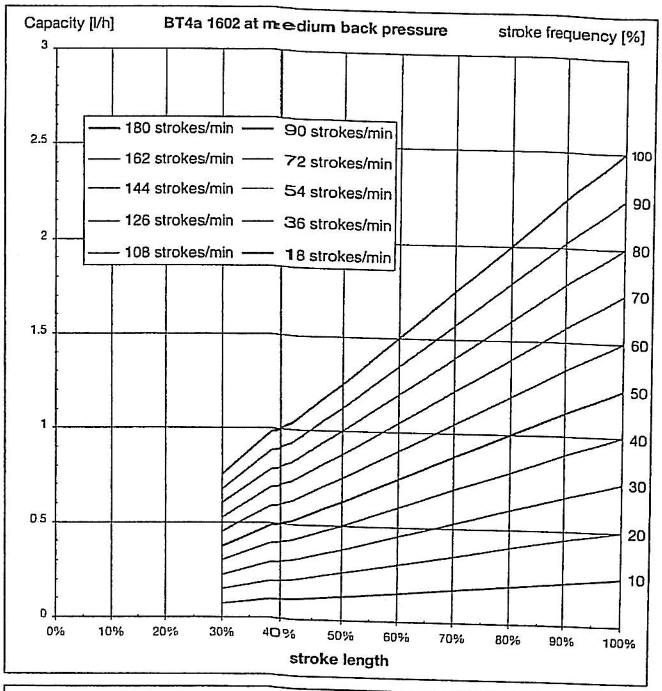
- ▶ Hold the relay component with your right hand gripping the left and right hand edges of the relay cover, and tilt the front end slightly to the left (see fig. 11b)
- ▶ Push the relay component through the relay opening, holding the upper corner of the lower edge against the guide rail on the pump base, until the contact of the relay component has reached the controller contact. (See fig. 11b test: can you still move the end of the circuit back and forth?)
- ▶ Gently push the relay component right into the opening.
- ▶ Screw the relay cover firmly onto the housing using the screws provided.
- ▶ Insert the relay cable plug seal into the relay cover and screw on the plug (see IIc).
- ▶ The pump is programmed ex factory to "alarm relay drop-out action" and, if fitted, "pacing relay pick-up action". The pump can be reprogrammed at the Heidelberg plant if any other switching function is required.

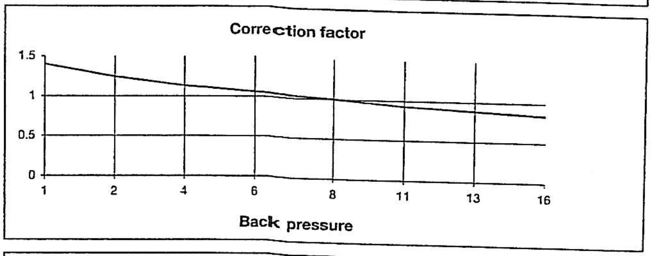


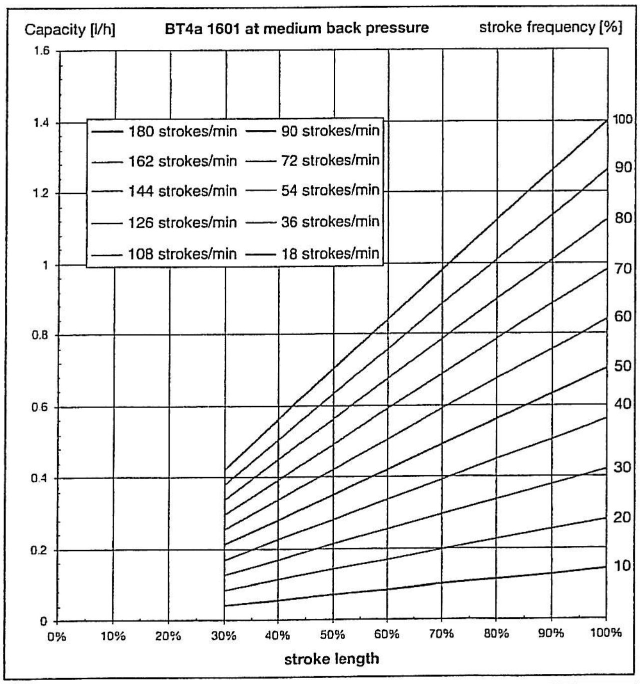
a Fig. 11 b c

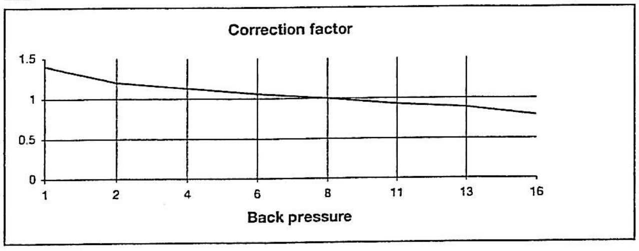

Capacity [l/h]
BT4a 1000 at medium back pressure
stroke frequency [%]
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length

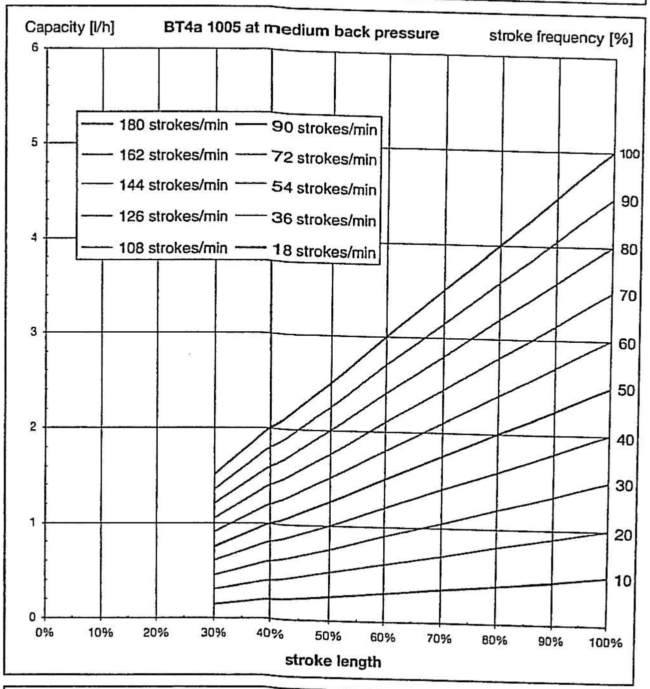

Correction factor
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
4
5
6
8
10
Back pressure

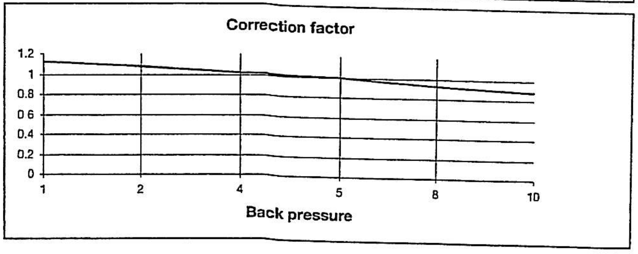

Capacity [l/h]
BT4a 1602 at medium back pressure
stroke frequency [%]
3
2.5
2
1.5
1
0.5
0
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length

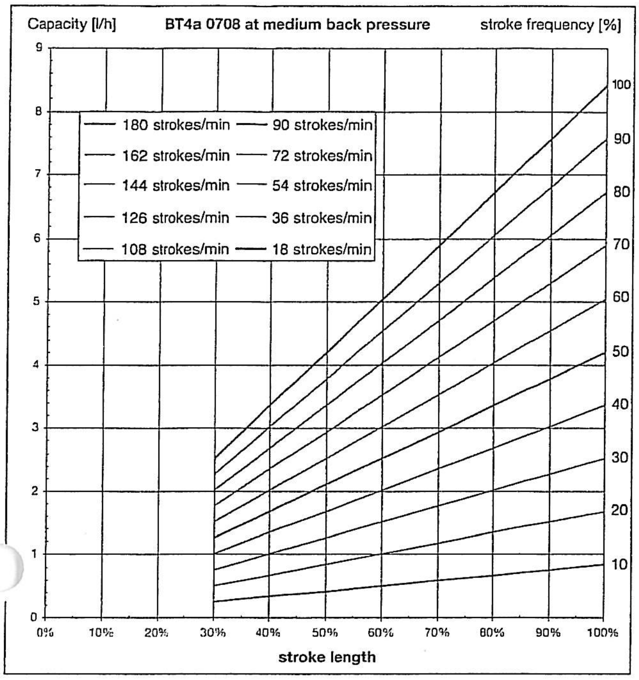

Correction factor
1.5
1
0.5
0
1
2
4
6
8
11
13
16
Back pressure

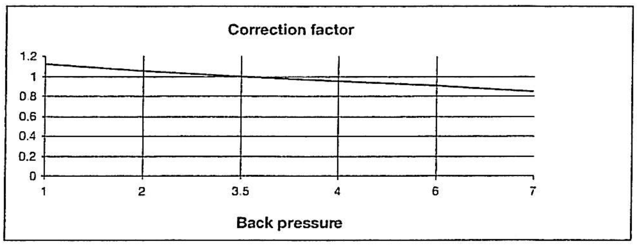

Capacity [l/h]
BT4a 1601 at medium back pressure
stroke frequency [%]
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length


Correction factor
1.5
1
0.5
0
1
2
4
6
8
11
13
16
Back pressure


Capacity [l/h]
BT4a 1005 at medium back pressure
stroke frequency [%]
6
5
4
3
2
1
0
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length


Correction factor
1.2
1
0.8
0.6
0.4
0.2
0
1
2
4
5
8
10
Back pressure


Capacity [l/h]
BT4a 0708 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0
1
2
3
4
5
6
7
8
9
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length


Correction factor
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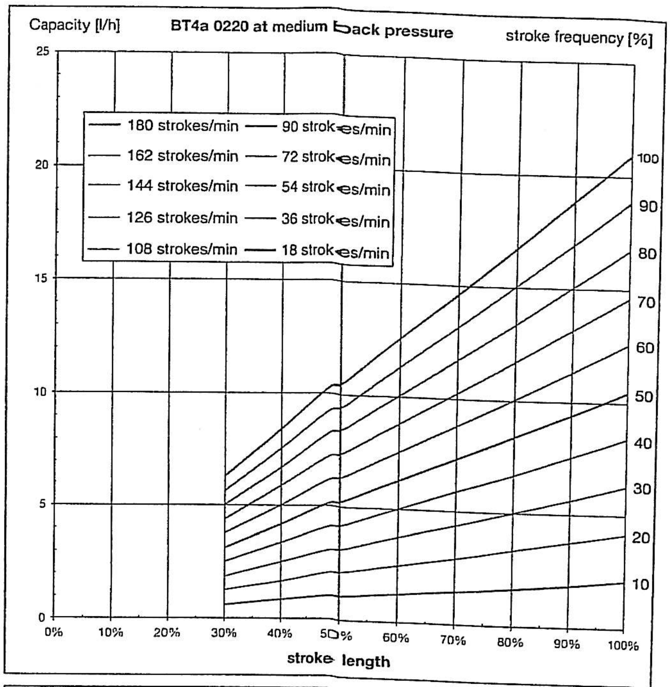
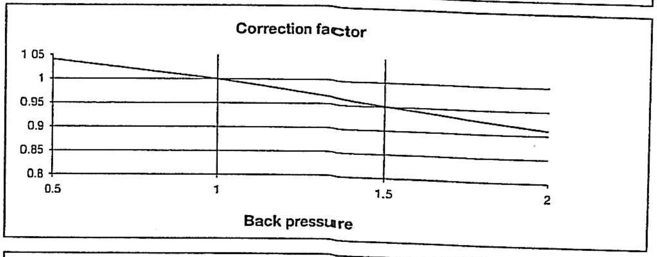
1
0.8
0.6
0.4
0.2
0
1
2
3.5
4
6
7
Back pressure


Capacity [l/h]
BT4a 0220 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0
5
10
15
20
25
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length


Correction factor
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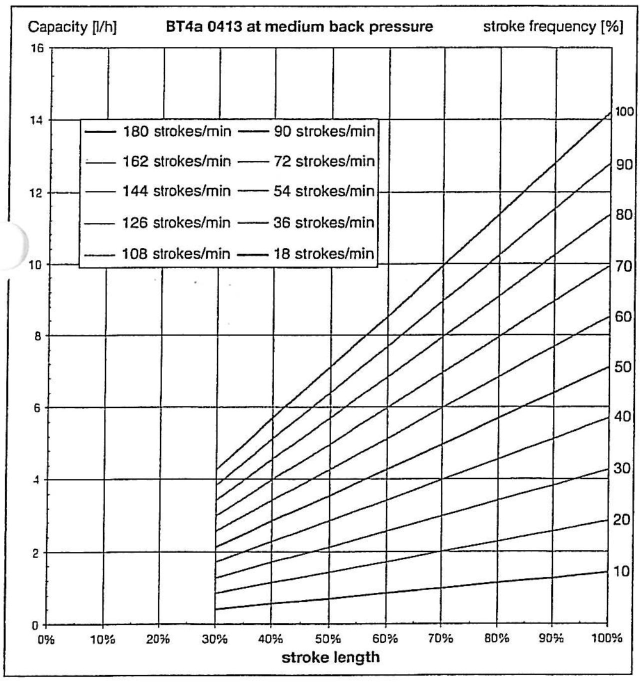
1
0.95
0.9
0.85
0.8
0.5
1
1.5
2
Back pressure


Capacity [l/h]
BT4a 0413 at medium back pressure
stroke frequency [%]
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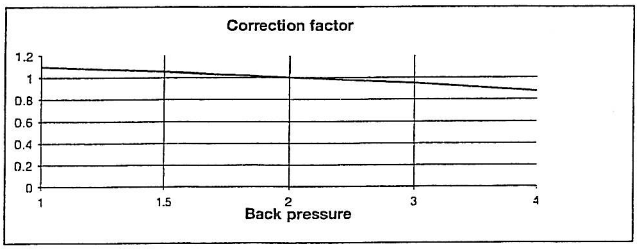
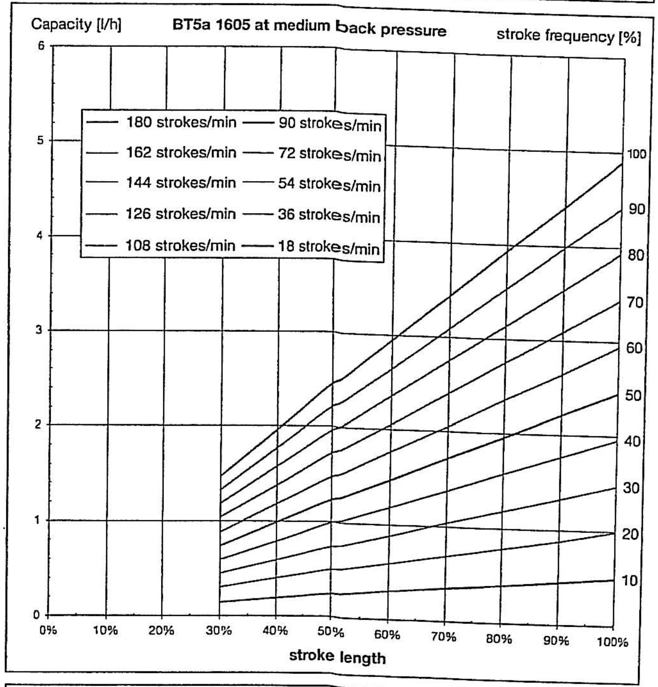
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0
2
4
6
8
10
12
14
16
100
90
80
70
60
50
40
30
20
10
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
stroke length


Correction factor
1.2
1
0.8
0.6
0.4
0.2
0
1
1.5
2
3
4
Back pressure


Capacity [l/h]
BT5a 1605 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0
1
2
3
4
5
6
100
90
80
70
60
50
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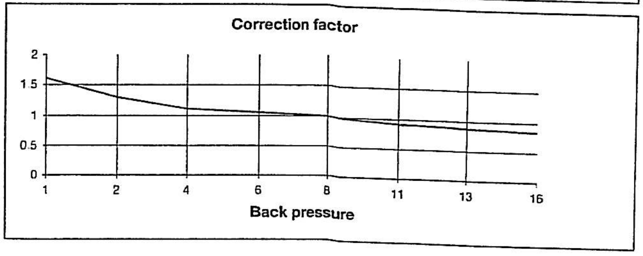
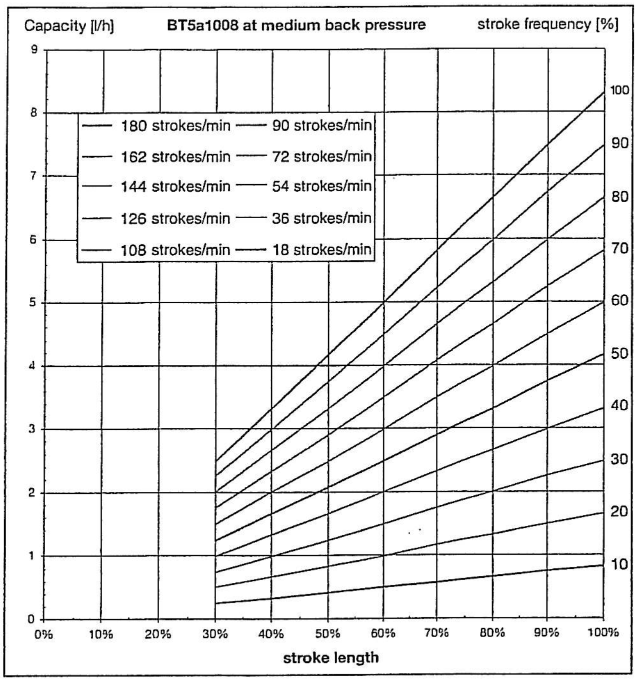
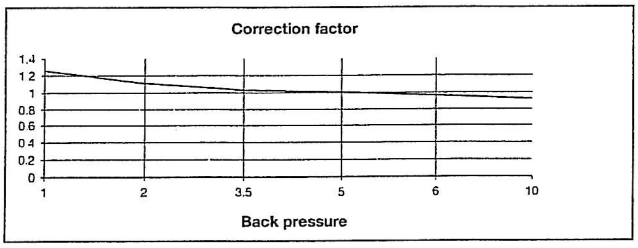
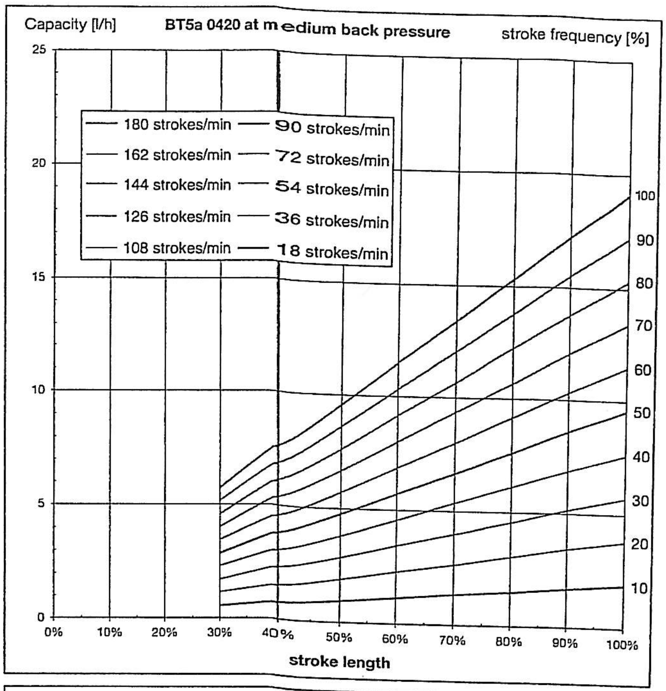
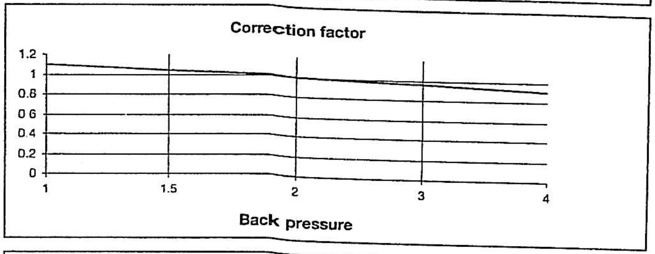
40%
50%
60%
70%
80%
90%
100%
stroke length

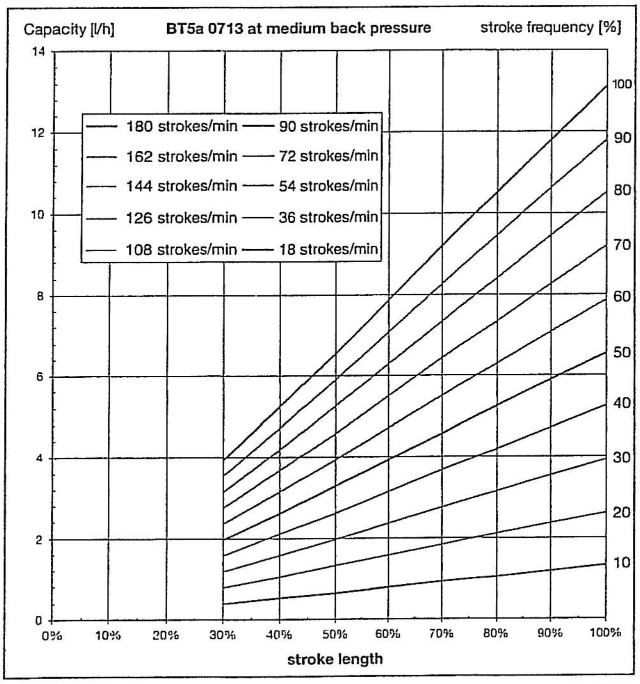

Correction factor
2
1.5
1
0.5
0
1
2
4
6
8
11
13
16
Back pressure

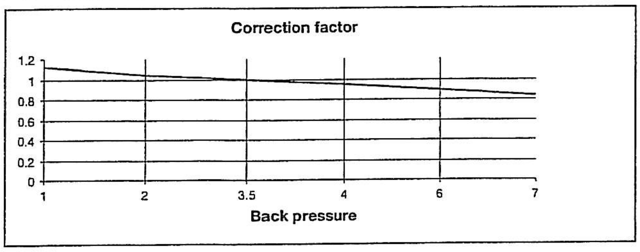

Capacity [l/h]
BT5a1008 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0 1 2 3 4 5 6 7 8 9
100 90 80 70 60 50 40 30 20 10
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
stroke length

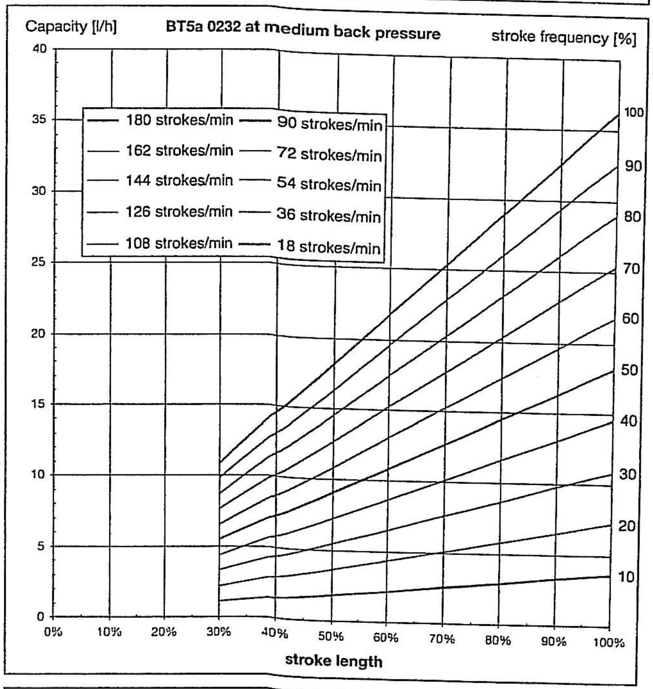

Correction factor
1.4 1.2 1 0.8 0.6 0.4 0.2 0
1 2 3.5 5 6 10
Back pressure


Capacity [l/h]
BT5a 0420 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0 5 10 15 20 25
100 90 80 70 60 50 40 30 20 10
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
stroke length


Correction factor
1.2 1 0.8 0.6 0.4 0.2 0
1 1.5 2 3 4
Back pressure


Capacity [l/h]
BT5a 0713 at medium back pressure
stroke frequency [%]
180 strokes/min
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0 2 4 6 8 10 12 14
100 90 80 70 60 50 40 30 20 10
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
stroke length


Correction factor
1.2 1 0.8 0.6 0.4 0.2 0
1 2 3.5 4 6 7
Back pressure


Capacity [l/h]
BT5a 0232 at medium back pressure
stroke frequency [%]
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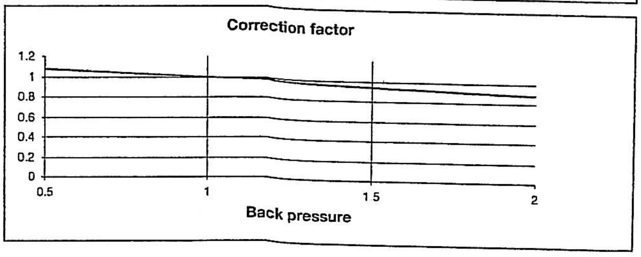
162 strokes/min
144 strokes/min
126 strokes/min
108 strokes/min
90 strokes/min
72 strokes/min
54 strokes/min
36 strokes/min
18 strokes/min
0 5 10 15 20 25 30 35 40
100 90 80 70 60 50 40 30 20 10
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
stroke length


Correction factor
1.2 1 0.8 0.6 0.4 0.2 0
0.5 1 1.5 2
Back pressure

8 Maintenance

Maintenance intervals

- Every quarter, when subject to normal usage (continuous operation - approx. 30 %).
- Shorter intervals when subject to heavier usage (e.g. continuous operation).

Maintenance actions

Standard liquid ends:

- ▶ Check the diaphragm for damage (see section 9).
- ▶ Check chemical seepage at vent hole.
- ▶ Check that the discharge tubing is connected firmly to the liquid end.
- ▶ Check that discharge and suction valves are firmly fixed.
- ▶ Check that the liquid end is generally watertight (especially vent hole! See fig. 13).
- ▶ Check for correct feed: run the Beta® run for a short period (press both arrow keys together).
- ▶ Check electrical connections for wear.
- ▶ Check that liquid end screws are fastened tightly (on coarse/fine bleeding versions, first remove knob and cover.

Screw fastening torque: 4.5 to 5 Nm

NOTE

- **For PP liquid end, check fastening torque every quarter!**

Additionally, for liquid ends with coarse/fine bleed function and SEK type:

- Check that the bypass tubing is connected firmly to the liquid end
- Check that the bleed valve is firmly fixed in place
- Examine the discharge and bypass tubing for kinks
- Check that the coarse/fine bleed function is working correctly

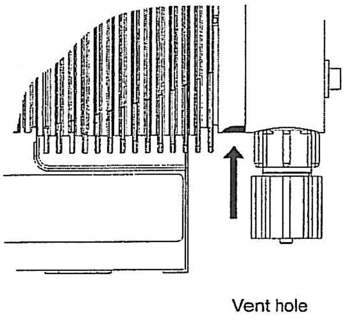


Fig. 13

9 Repairs

NOTE

Repair work that may be carried out by authorised personnel only, or on factory premises:

- **Replacement of damaged mains cables.**
- **Replacement of fuses and electronic controller.**

Please contact your nearest ProMinent branch or representative!

When sending the pump for repair make sure it is clean and that the liquid end has been thoroughly rinsed out! If, despite careful emptying and cleaning, safety precautions are still required for handling the Beta®, the necessary information must be entered in the safety declaration!

The safety declaration is a component of the inspection/repair order.

An inspection or repair can only be carried out when a safety declaration has been correctly and completely filled out by an authorised and qualified member of staff from the company operating the pump.

A form is included in the “General Operating Instruction Manual ProMinent® Solenoid Metering Pumps”.

WARNING

Pumps used for radioactive materials cannot be returned to ProMinent after use! They will not be accepted by ProMinent!

Repairs: These should only be carried out by qualified personnel (in accordance with Safety section):

- **Cleaning the valve**
- **Changing the diaphragm**

WARNING

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure equipment is de-pressurised.**

NOTE

Take the exploded drawings annexed to the help.

Cleaning the discharge valve (PP, NP) for types 1000, 1005, 1605, 1601, 1602

NOTE

- **Discharge and suction valves are different! Dismantle one after the other to avoid confusion.**
- **Only use new parts, which fit your valve (in shape and chemical resistance)!**
- **The pump must be reset after replacing a valve.**
- **Insert an Allen key or similar into the smaller hole of the pressure connector and push out the valve inserts.**

Cleaning the suction valve (PP, NP) for types 1000, 1005, 1605, 1601, 1602

Dismantling, cleaning and reassembly of the suction valve is practically the same as for a discharge valve.

Take care however that:

- both valve inserts are actually identical,
- an additional spacer is found under the valve inserts,
- in the liquid end a shaped seal 1 is used instead of an O-ring,
- the flow direction of the suction connection is reversed as for the pressure connector.

Cleaning the discharge valve (PP, PC, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

NOTE

- **Discharge and suction valves are different! Dismantle one after the other to avoid confusion!**
- **Only use new parts, which fit your valve (in shape and chemical resistance)!**
- **The pump must be reset after replacing a valve.**
- **Insert an Allen key or similar into the smaller hole of the pressure connector and push out the valve inserts.**

Cleaning the suction valve (PP, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

Dismantling, cleaning and reassembling of a suction valve is practically the same as for a discharge valve. Please ensure, however, that:

- the shaped seal is placed in the suction connector,
- only the O-ring is inserted into the liquid end and not the shaped seal,
- the flow direction for the suction connector is reversed as for the pressure connector.

Change diaphragm

WARNING

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure that the equipment is de-pressurised!**

▶ Empty the liquid end (turn the unit upside down and let the feed chemical run out, rinse with a suitable material: rinse the liquid end thoroughly after use with hazardous materials!).

▶ When Beta® is running set the stroke length to 0 % (the drive axis is then set).

▶ Switch off the Beta®.

▶ Unscrew the hydraulic connectors from the discharge and suction side.

▶ For versions with coarse/fine bleed function: firstly pull out the coarse/fine bleed (knob), then lift off the cover from the liquid end using a screwdriver.

▶ Remove the screws (1).

For pump types 0220, 0232 and 0420 see the following page (4 holes on the diaphragm rim)!

Standard types

▶ Loosen the liquid end (2) and the top plate (4) from the pump housing (6) (loosen only!).

▶ Hold the housing (6) in one hand and with the other, clamp the diaphragm (3) between the liquid end (2) and the top plate (4); release the diaphragm (3) from the drive spindle with a light anticlockwise turn of the liquid end (2) and top plate (4).

▶ Unscrew the diaphragm (3) completely from the drive spindle.

▶ Remove the top plate (4) from the housing (6).

▶ Check the condition of the safety diaphragm (5) and replace if necessary.

▶ Push the safety diaphragm (5) onto the drive axle until the outer edge is flush with the pump housing (6) - do not push further!

▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!

▶ Screw the diaphragm (3) tight once more.

▶ Position the top plate (4) on the pump housing (6).

IMPORTANT

- **The leakage hole must point downwards when the pump is fully assembled (see fig. 13)**
- **Position the top plate correctly on the pump housing. Do not distort the top plate on the pump housing, otherwise the safety diaphragm (5) will not fit.**

▶ Lay the diaphragm (3) into the top plate (4).

▶ Hold the top plate and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

IMPORTANT

- **Do not overtighten the diaphragm (particularly on type 1601).**
- **The top plate must remain in position to prevent the safety diaphragm (5) from distorting.**

▶ Adjust the stroke to 100 %.

▶ Position the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled). Screw on screws (1) lightly and tighten (starting torque, see below).

▶ For versions with coarse/fine bleed function, ensure that the liquid end cover engages in the liquid end, then push the coarse/fine bleed vent (knob) into the liquid end.

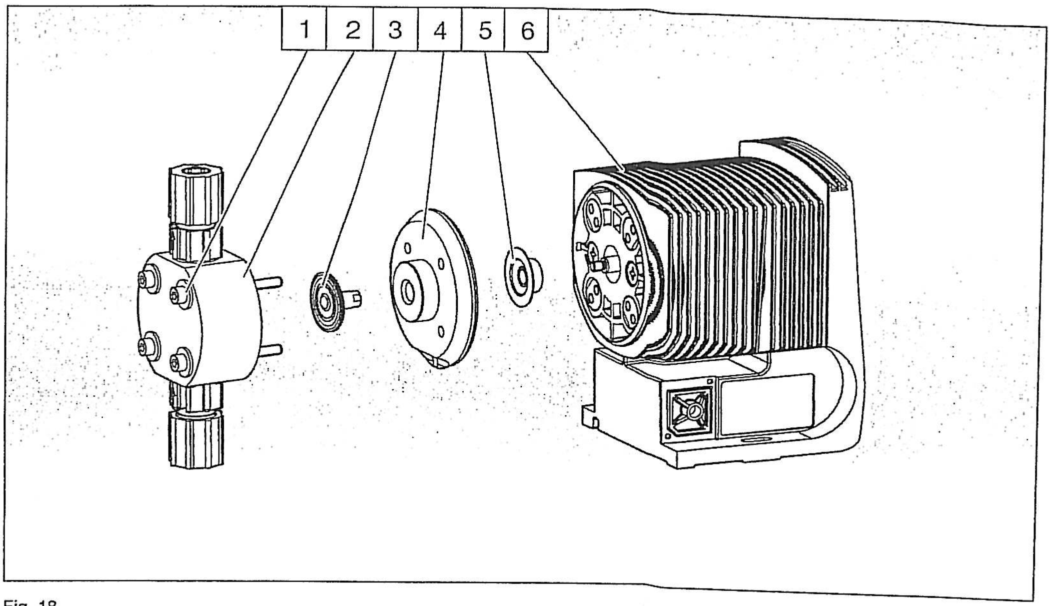


Fig. 18

1 Screws
2 Liquid end
3 Diaphragm
4 Top plate
5 Safety diaphragm
6 Pump housing

NOTE

- **Check the screw torques after 24 hours in operation.**
- **For PP liquid ends check the screw torques again after three months.**

Screw torques:	4.5 to 5 Nm

Liquid ends - types 0220, 0232 and 0420

- ▶ Remove liquid end (2) from the pump by unscrewing screws (1) (see Fig. 30).
  Type 0230 only: remove the screws from the back plate (4) below the diaphragm (3).
  Screw liquid end (2) back on – the screws (1) should still project into the holes of the diaphragm (3) but not into the liquid end.
- ▶ Take hold of the pump housing (6) and use the other hand to clamp the diaphragm (3) between the liquid end (2) and the back plate (4). Loosen the diaphragm (3) from the drive axis by lightly turning the liquid end (2) and the back plate (4) anticlockwise.
- ▶ Draw the liquid end (2) with the screws (1) out of the diaphragm (3) and unscrew it completely from the drive axis.
- ▶ Remove the back plate (4) from the housing (6).
- ▶ Check the condition of the safety diaphragm (5) and replace it if necessary.
- ▶ Push the safety diaphragm (5) onto the drive axle until the outer edge is flush with the pump housing (6) - do not push further!
- ▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!
- ▶ Check whether the holes in the diaphragm (3) are flush with the holes in the pump housing (6).
- ▶ If not, start the pump and set the stroke length to 100 %.
- ▶ When the pump is running, turn the diaphragm (3) slowly in a clockwise direction until the four holes in the diaphragm are flush with those on the pump housing (6).
- ▶ Hold the diaphragm (3) in this position, set the stroke length to 0 % and stop the pump.
- ▶ Screw the diaphragm (3) tight once more.
- ▶ Position the top plate (4) on the pump housing (6).
  Only for Type 0232: Screw down the head disk (4) with the screws.

IMPORTANT

- **The leakage hole must point downwards when the pump is fully assembled (see fig. 13).**
- **Position the top plate correctly onto the pump housing. Do not distort the top plate on the pump housing, otherwise the safety diaphragm will not fit.**

▶ Adjust the stroke to 100 %.

▶ Lay the diaphragm (3) into the top plate (4).

▶ Hold the top plate and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

IMPORTANT

- **Do not overtighten the diaphragm.**
- **The top plate must remain in position to prevent the safety diaphragm from distorting.**

▶ Position the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled). Screw on screws (1) lightly and tighten (starting torque, see above).

▶ For coarse/fine bleed versions: ensure the liquid end cover engages in the liquid end, then push the coarse/fine bleed (knob) into the liquid end.

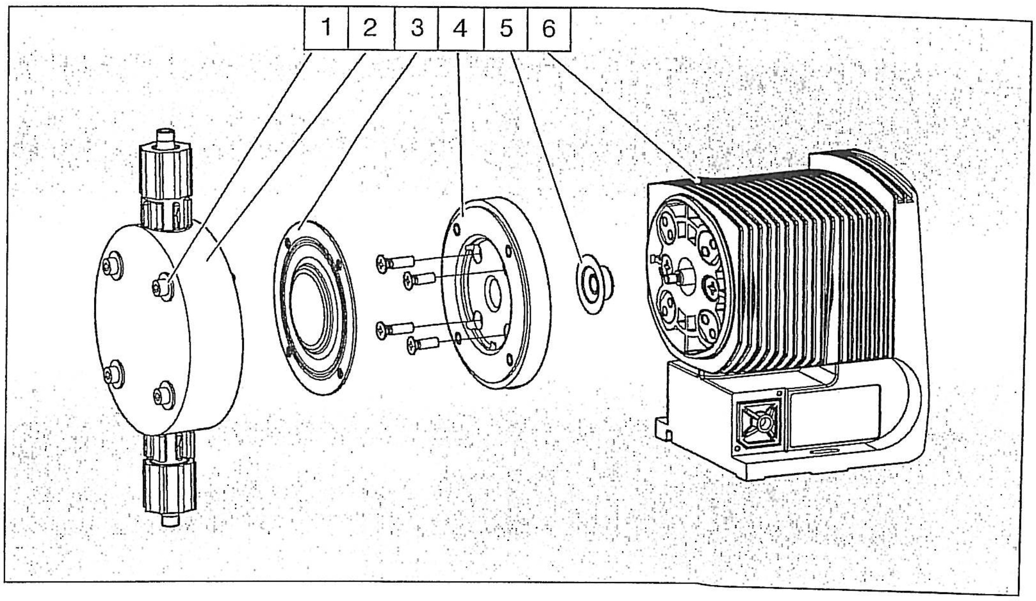


Fig. 19

1 Screws
2 Liquid end
3 Diaphragm
4 Top plate
5 Safety diaphragm
6 Pump housing

NOTE

- **Check the screw torque after 24 hours in operation!**
- **For PP liquid ends recheck the screw torque after three months!**

Screw torques: 4.5 to 5 Nm

10 Troubleshooting

⚠ *IMPORTANT*

- **Wear protective goggles and clothing when working with hazardous chemicals!**
- **Please observe the safety information sheets for dosing media!**
- **Always de-pressurise the liquid end prior to working on a pump!**

Pump is not priming even at full stroke length, and open bleed valve.

Reason Crystalline deposits on the ball seat because valve has dried out.

Remedy ▶ Detach suction tubing from chemical feed container and rinse liquid end thoroughly.

▶ If this fails, dismantle valves and clean.

Green LED display (operating display) not lit

Reason Power supply not connected, or incorrect power supply.

Remedy ▶ Connect to correct power supply according to the details on the device label.

Reason Fuse is defective.

Remedy ▶ Contact your ProMinent branch or supplier!

Yellow LED display (warning indicator) is lit

Reason Liquid level in the feed tank has reached the first float-switch trigger level.

Remedy ▶ Refill chemical tank.

Red LED display (fault indicator) is lit

Reason Liquid level in the feed tank has reached the fault float-switch trigger level (20 mm from empty).

Remedy ▶ Refill chemical tank.

Red LED display (fault indicator) is flashing

Reason Pump operating mode is undefined.

Remedy ▶ Select the required operating mode.

Liquid is leaking from back plate

Reason There is a faulty seal between the liquid end and the diaphragm.

Remedy ▶ Tighten screws in the liquid end.

▶ If this fails, replace diaphragm.

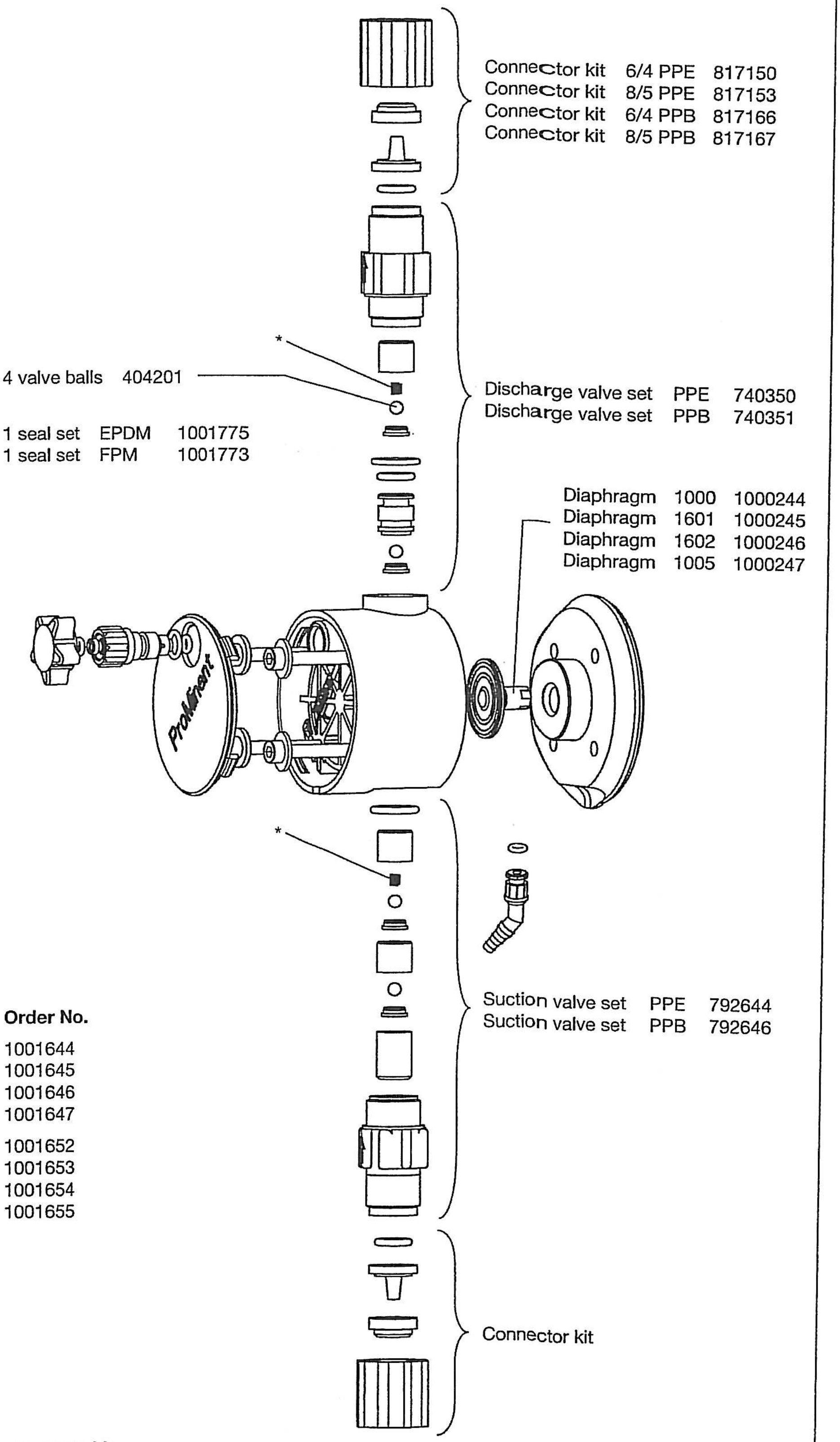
11 Decommissioning, Dismantling and Disposal

NOTE

- **When dismantling a pump, clean thoroughly, paying particular attention to the liquid end in order to remove all traces of chemicals and dirt.**
- **When disposing of a pump it must be broken down into separate material types. All parts must be sent for recycling or for correct disposal according to current legal waste disposal requirements.**

Cleaned, chemical-free pumps may be returned to your ProMinent branch for disposal.

Liquid end 1000 - 1005 (1605)
PP with coarse/fine bleed



Connector kit 6/4 PPE 817150
Connector kit 8/5 PPE 817153
Connector kit 6/4 PPB 817166
Connector kit 8/5 PPB 817167

4 valve balls 404201

1 seal set EPDM 1001775
1 seal set FPM 1001773

Discharge valve set PPE 740350
Discharge valve set PPB 740351

Diaphragm	1000	1000244
Diaphragm	1601	1000245
Diaphragm	1602	1000246
Diaphragm	1005	1000247

Suction valve set PPE 792644
Suction valve set PPB 792646

Connector kit

Spare parts kits for:

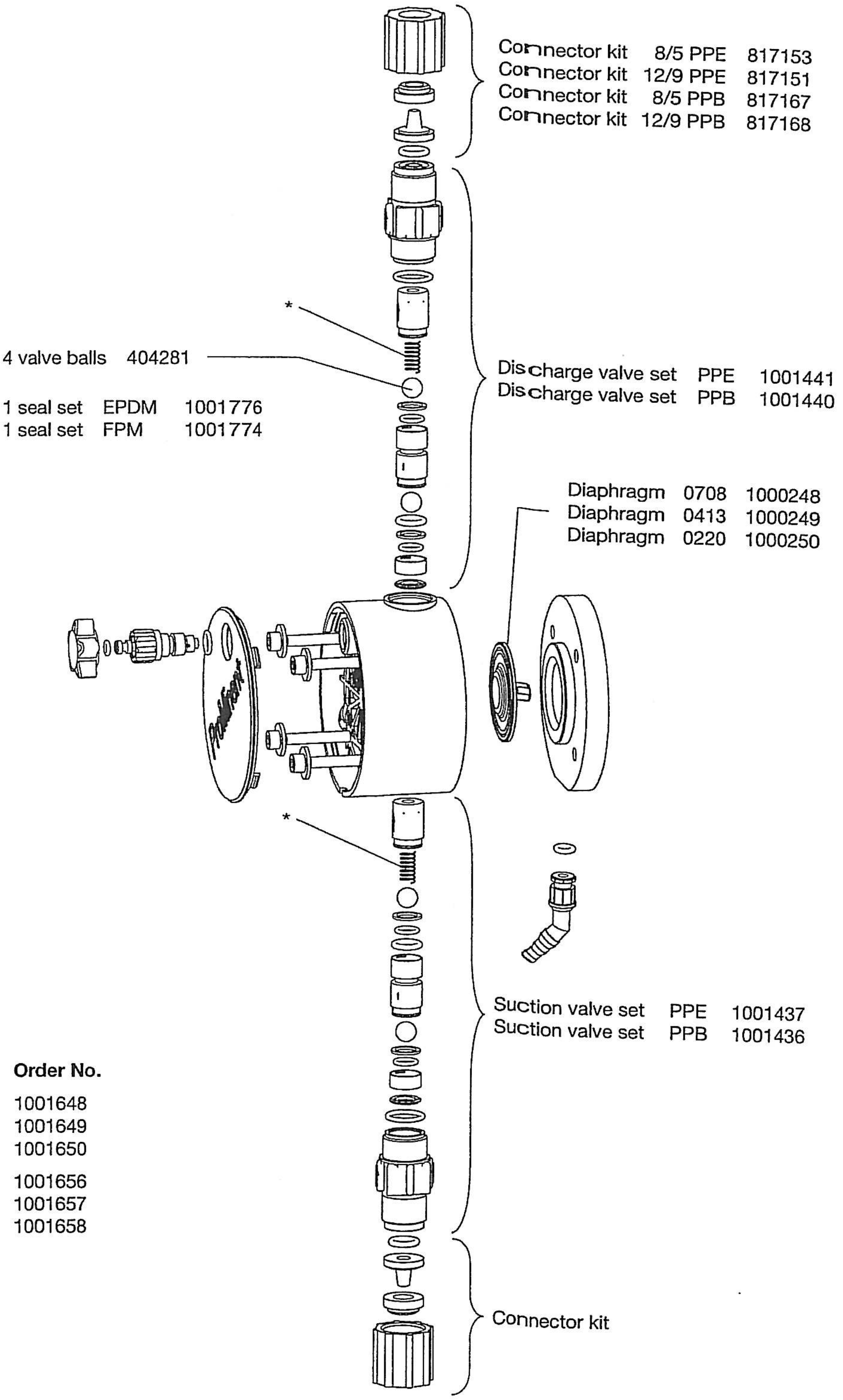
Type	Material	Order No.
1000	PPE	1001644
1601	PPE	1001645
1602	PPE	1001646
1005 (1605)	PPE	1001647
1000	PPB	1001652
1601	PPB	1001653
1602	PPB	1001654
1005 (1605)	PPB	1001655

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_18-04_2

Liquid end 0708 (1008) - 0220 (0420)
PP with coarse/fine bleed


Connector kit 8/5 PPE 817153
Connector kit 12/9 PPE 817151
Connector kit 8/5 PPB 817167
Connector kit 12/9 PPB 817168
*
4 valve balls 404281
1 seal set EPDM 1001776
1 seal set FPM 1001774
Discharge valve set PPE 1001441
Discharge valve set PPB 1001440
Diaphragm 0708 1000248
Diaphragm 0413 1000249
Diaphragm 0220 1000250
*
Suction valve set PPE 1001437
Suction valve set PPB 1001436
Connector kit

Spare parts kits for:

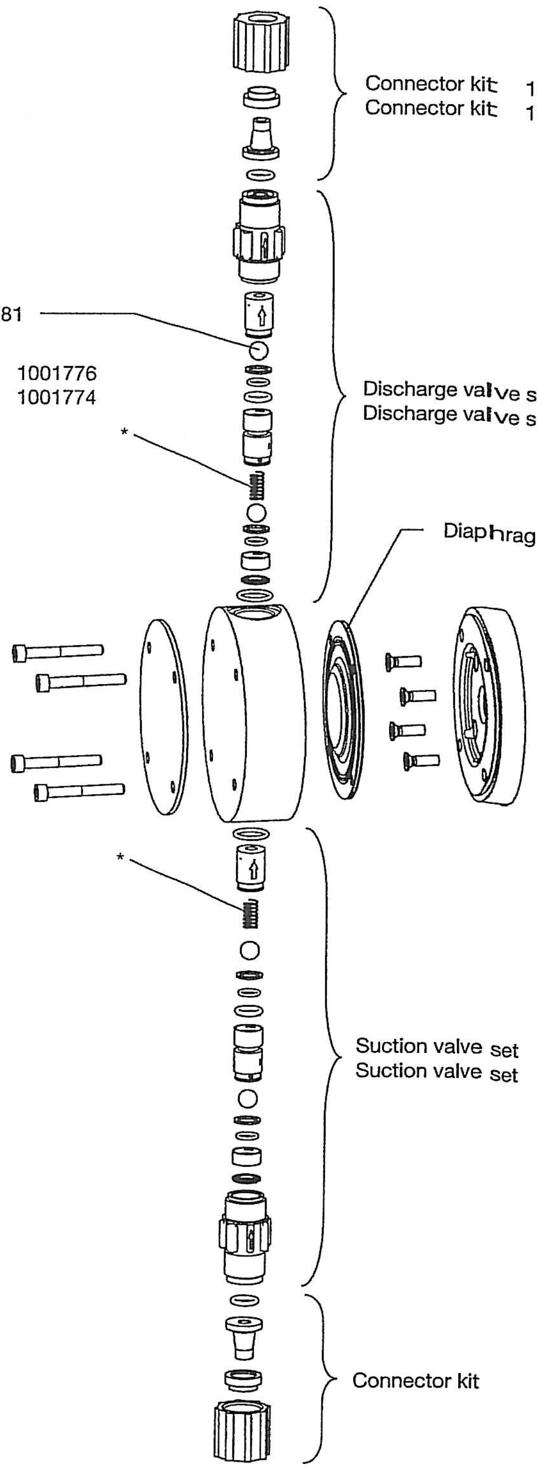
Type	Material	Order No.
0708 (1008)	PPE	1001648
0413 (0713)	PPE	1001649
0220 (0420)	PPE	1001650
0708 (1008)	PPB	1001656
0413 (0713)	PPB	1001657
0220 (0420)	PPB	1001658

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_19-04_2

Liquid end 0232
PP without coarse/fine bleed



Connector kit 12/9 PPE 817151
Connector kit 12/9 PPB 817168

4 valve balls 404281

1 seal set EPDM 1001776
1 seal set FPM 1001774

*

Discharge valve set PPE 1001441
Discharge valve set PPB 1001440

Diaphragm 0232 1000251

*

Suction valve set PPE 1001437
Suction valve set PPB 1001436

Connector kit

Spare parts kits for:

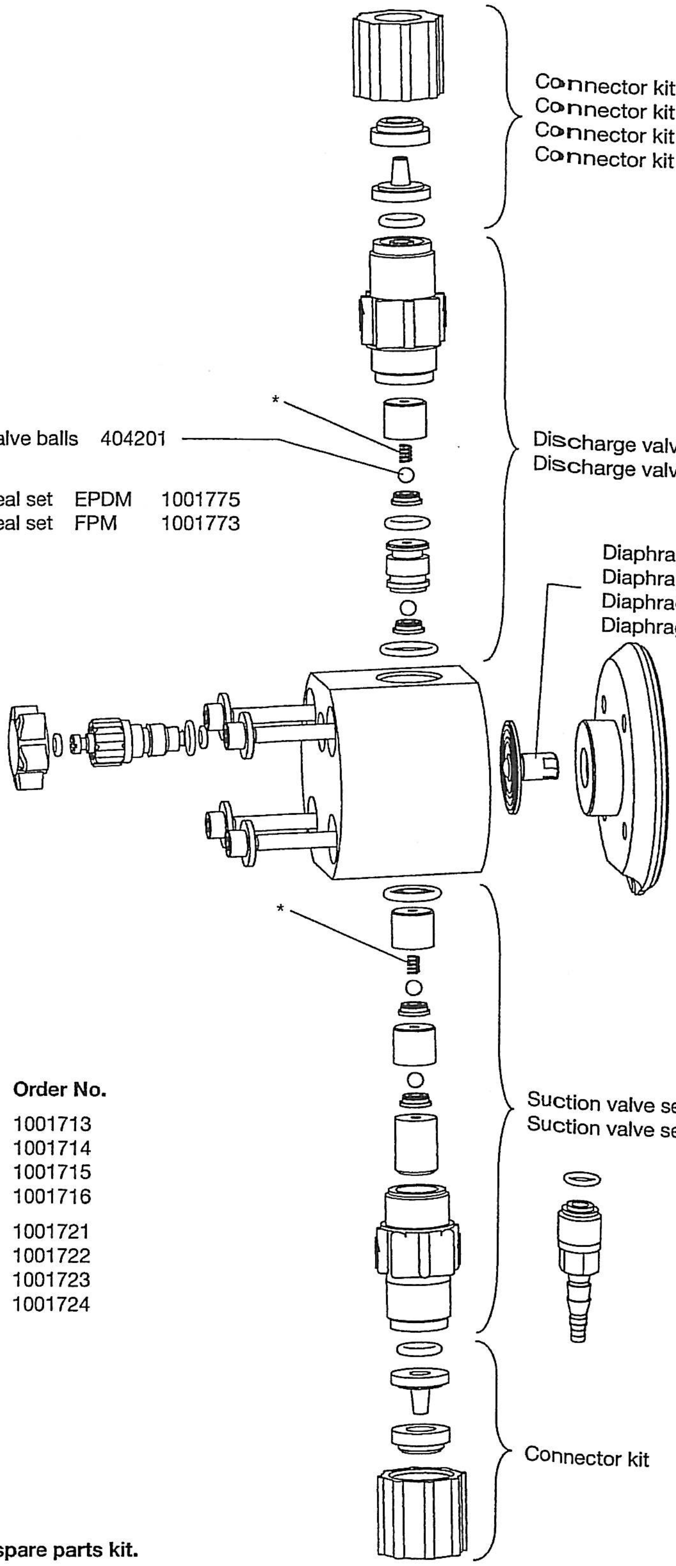
Type	**Material**	**Order No.**
0232	PPE	1001651
0232	PPB	1001659

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_40-04_2

Liquid end 1000 - 1005 (1605)
NP with coarse/fine bleed



Connector kit	6/4 PCE	817060
Connector kit	8/5 PCE	817048
Connector kit	6/4 PCB	817050
Connector kit	8/5 PCB	817053

Discharge valve set	PCE	740349
Discharge valve set	PCB	740348

4 valve balls 404201

1 seal set	EPDM	1001775
1 seal set	FPM	1001773

Diaphragm	1000	1000244
Diaphragm	1601	1000245
Diaphragm	1602	1000246
Diaphragm	1005	1000247

Suction valve set	PCE	792119
Suction valve set	PCB	792026

Connector kit

Spare parts kits for:

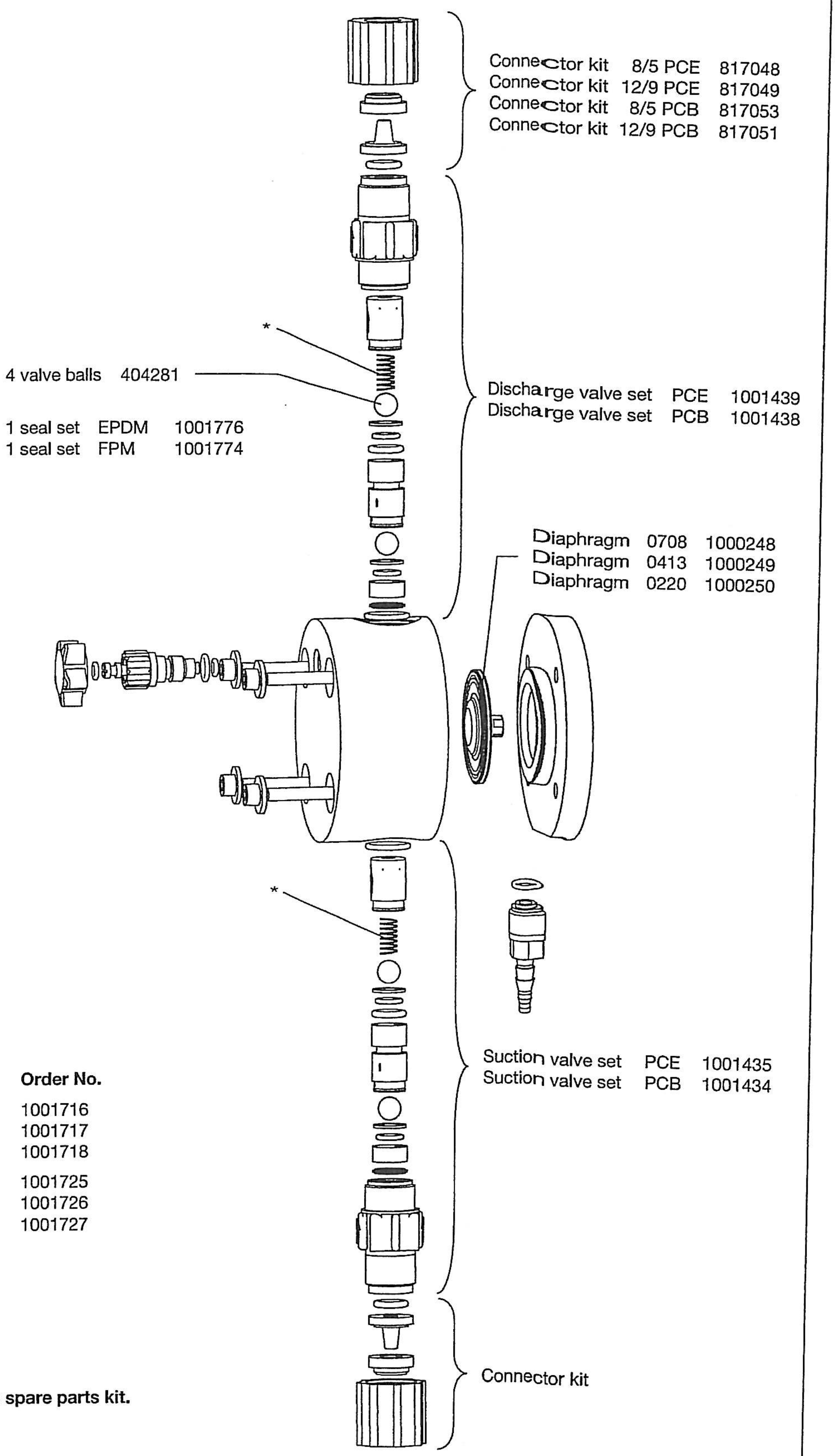
Type	Material	Order No.
1000	NPE	1001713
1601	NPE	1001714
1602	NPE	1001715
1005 (1605)	NPE	1001716
1000	NPB	1001721
1601	NPB	1001722
1602	NPB	1001723
1005 (1605)	NPB	1001724

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_23-04_2

Liquid end 0708 (1008) - 0220 (0420)
NP with coarse/fine bleed


Connector kit 8/5 PCE 817048
Connector kit 12/9 PCE 817049
Connector kit 8/5 PCB 817053
Connector kit 12/9 PCB 817051
*
4 valve balls 404281
1 seal set EPDM 1001776
1 seal set FPM 1001774
Discharge valve set PCE 1001439
Discharge valve set PCB 1001438
Diaphragm 0708 1000248
Diaphragm 0413 1000249
Diaphragm 0220 1000250
*
Suction valve set PCE 1001435
Suction valve set PCB 1001434
Connector kit

Spare parts kits for:

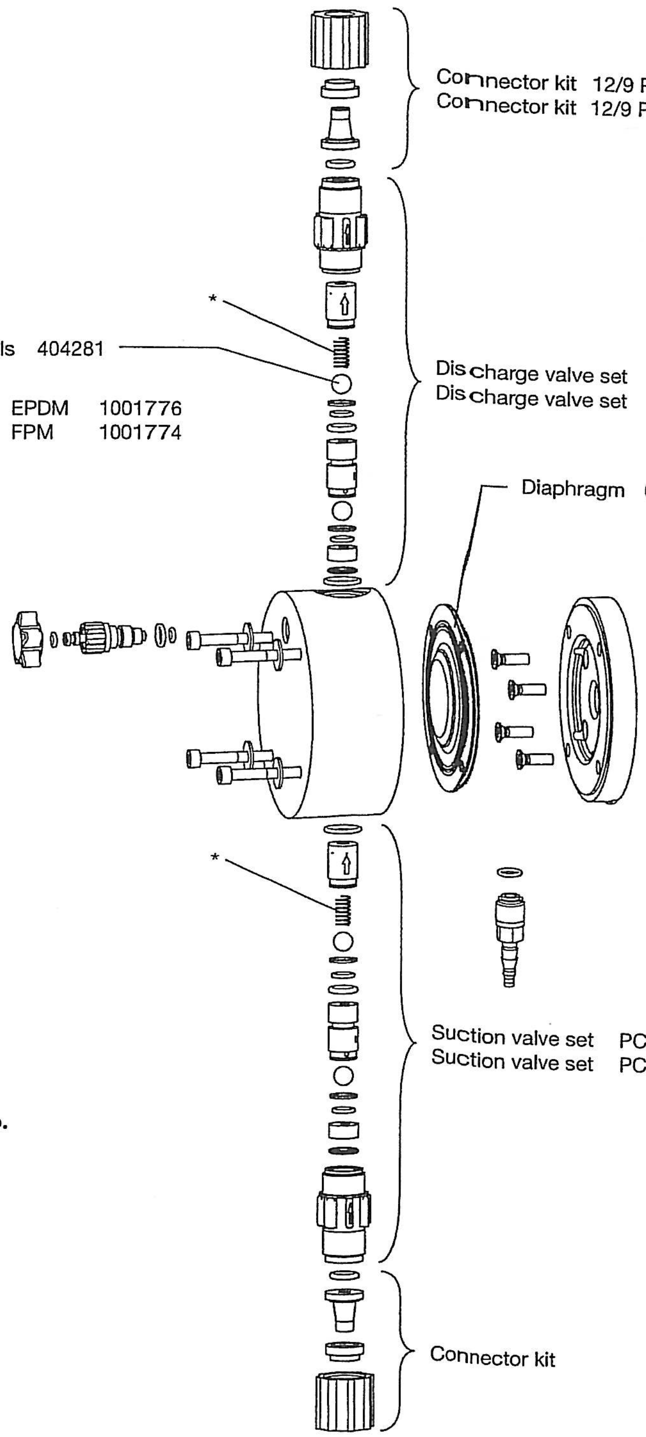
Type	Material	Order No.
0708 (1008)	NPE	1001716
0413 (0713)	NPE	1001717
0220 (0420)	NPE	1001718
0708 (1008)	NPB	1001725
0413 (0713)	NPB	1001726
0220 (0420)	NPB	1001727

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_24-04_2

Liquid end 0232
NP with coarse/fine bleed



Connector kit 12/9 PCE 817049
Connector kit 12/9 PCB 817051

4 valve balls 404281

1 seal set EPDM 1001776
1 seal set FPM 1001774

Discharge valve set PCE 1001439
Discharge valve set PCB 1001438

Diaphragm 0232 1000251

Suction valve set PCE 1001435
Suction valve set PCB 1001434

Connector kit

Spare parts kits for:

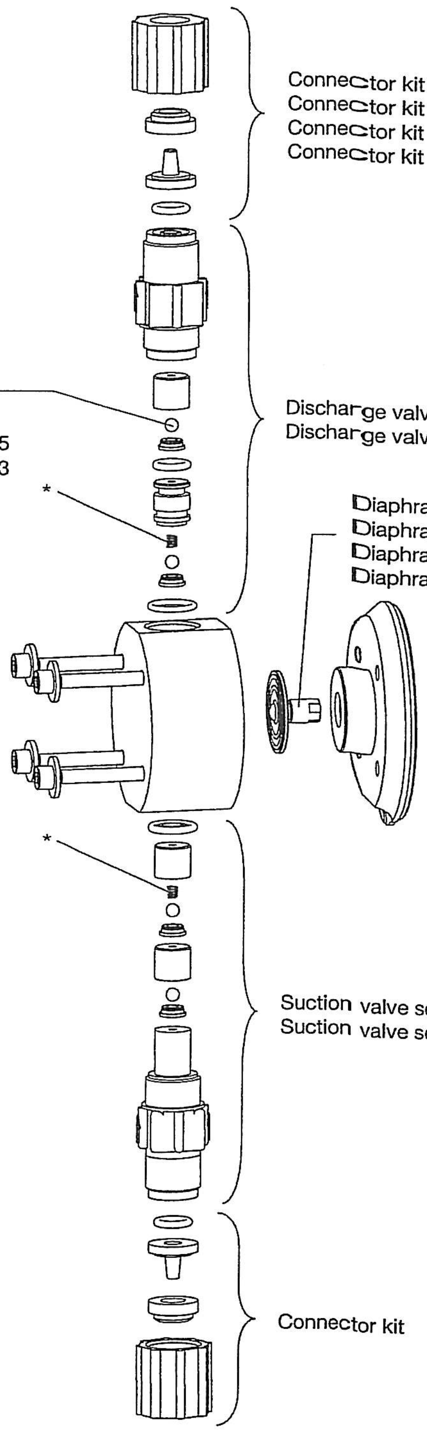
Type	**Material**	**Order No.**
0232	NPE	1001719
0232	NPB	1001728

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_34-04_2

Liquid end 1000 - 1005 (1605)
NP without coarse/fine bleed



Connector kit 6/4 PCE 817060
Connector kit 8/5 PCE 817048
Connector kit 6/4 PCB 817050
Connector kit 8/5 PCB 817053

4 valve balls 404201

1 seal set EPDM 1001775
1 seal set FPM 1001773

Discharge valve set PCE 740349
Discharge valve set PCB 740348

Diaphragm 1000 1000244
Diaphragm 1601 1000245
Diaphragm 1602 1000246
Diaphragm 1005 1000247

Suction valve set PCE 792119
Suction valve set PCB 792026

Connector kit

Spare parts kits for:

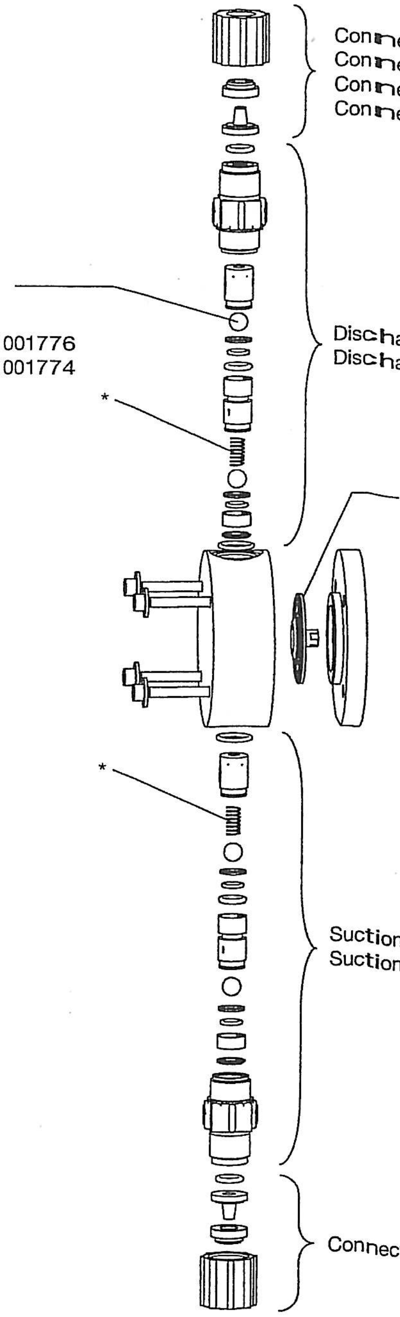
Type	**Material**	**Order No.**
1000	NPE	1001713
1601	NPE	1001714
1602	NPE	1001715
1005 (1605)	NPE	1001716
1000	NPB	1001721
1601	NPB	1001722
1602	NPB	1001723
1005 (1605)	NPB	1001724

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_21-04_2

Liquid end 0708 (1008) - 0220 (0420)
NP without coarse/fine bleed


Connector kit 8/5 PCE 817048
Connector kit 12/9 PCE 817049
Connector kit 8/5 PCB 817053
Connector kit 12/9 PCB 817051
4 valve balls 404281
1 seal set EPDM 1001776
1 seal set FPM 1001774
*
Discharge valve set PCE 1001439
Discharge valve set PCB 1001438
Diaphragm 0708 1000248
Diaphragm 0413 1000249
Diaphragm 0220 1000250
*
Suction valve set PCE 1001435
Suction valve set PCB 1001434
Connector kit

Spare parts kits for:

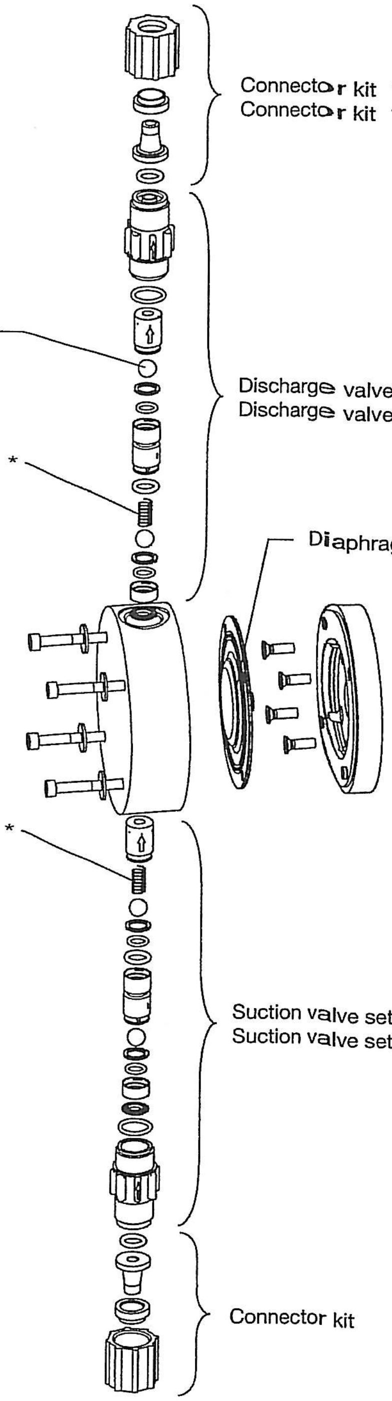
Type	Material	Order No.
0708 (1008)	NPE	1001716
0413 (0713)	NPE	1001717
0220 (0420)	NPE	1001718
0708 (1008)	NPB	1001725
0413 (0713)	NPB	1001726
0220 (0420)	NPB	1001727

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_22-04_2

Liquid end 0232
NP without coarse/fine bleed



Connector kit 12/9 PCE 817049
Connector kit 12/9 PCB 817051

4 valve balls 404281

1 seal set EPDM 1001776
1 seal set FPM 1001774

Discharge valve set PCE 1001439
Discharge valve set PCB 1001438

*

Diaphragm 0232 1000251

*

Suction valve set PCE 1001435
Suction valve set PCB 1001434

Connector kit

Spare parts kits for:

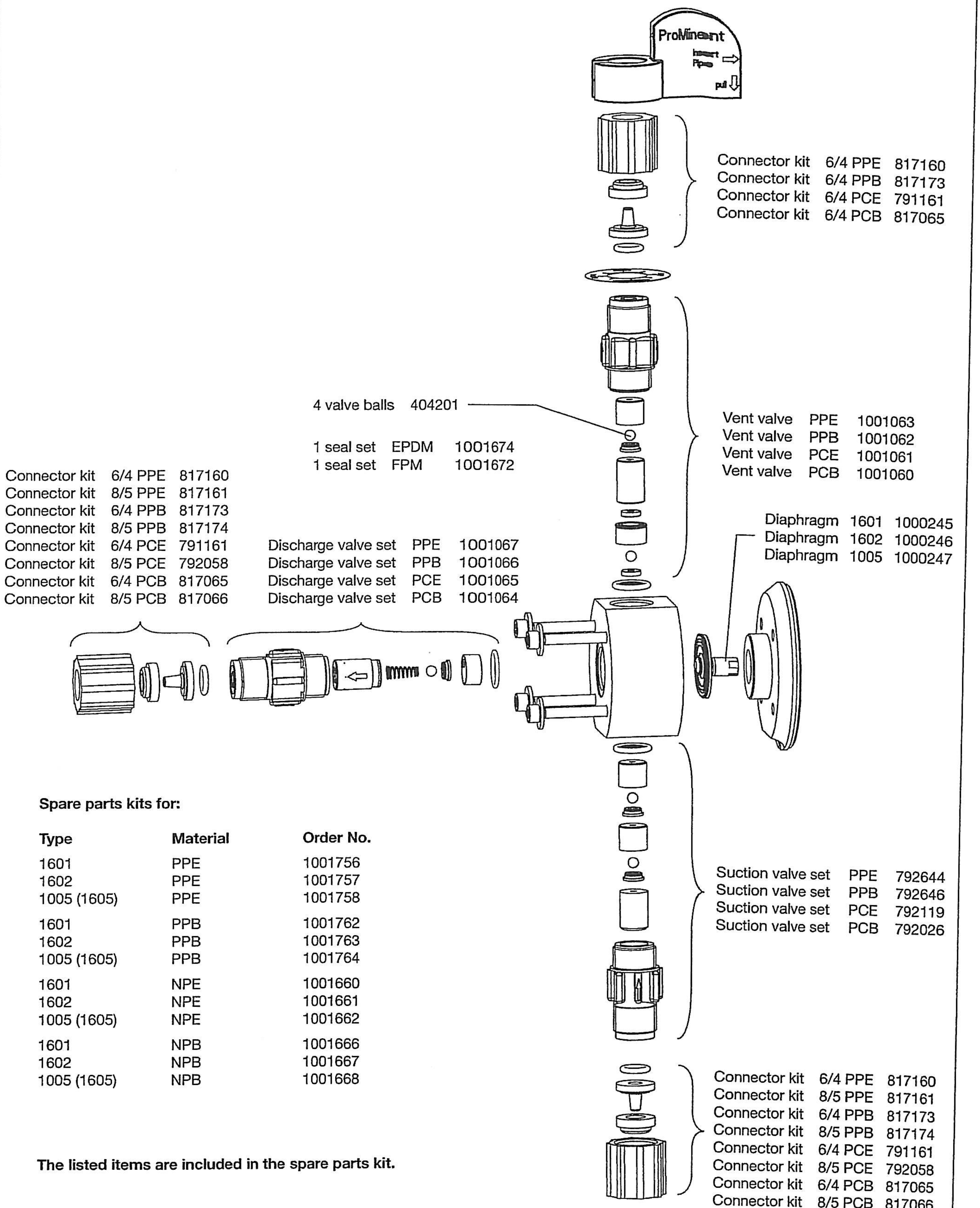
Type	Material	Order No.
0232	NPE	1001719
0232	NPB	1001728

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_20-04_2

Liquid end 1601 - 1005 (1605)
PP / NP self-degassing



Connector kit	6/4 PPE	817160
Connector kit	6/4 PPB	817173
Connector kit	6/4 PCE	791161
Connector kit	6/4 PCB	817065

Vent valve	PPE	1001063
Vent valve	PPB	1001062
Vent valve	PCE	1001061
Vent valve	PCB	1001060

4 valve balls 404201

1 seal set	EPDM	1001674
1 seal set	FPM	1001672

Diaphragm	1601	1000245
Diaphragm	1602	1000246
Diaphragm	1005	1000247

Connector kit	6/4 PPE	817160
Connector kit	8/5 PPE	817161
Connector kit	6/4 PPB	817173
Connector kit	8/5 PPB	817174
Connector kit	6/4 PCE	791161
Connector kit	8/5 PCE	792058
Connector kit	6/4 PCB	817065
Connector kit	8/5 PCB	817066

Discharge valve set	PPE	1001067
Discharge valve set	PPB	1001066
Discharge valve set	PCE	1001065
Discharge valve set	PCB	1001064

Suction valve set	PPE	792644
Suction valve set	PPB	792646
Suction valve set	PCE	792119
Suction valve set	PCB	792026

Connector kit	6/4 PPE	817160
Connector kit	8/5 PPE	817161
Connector kit	6/4 PPB	817173
Connector kit	8/5 PPB	817174
Connector kit	6/4 PCE	791161
Connector kit	8/5 PCE	792058
Connector kit	6/4 PCB	817065
Connector kit	8/5 PCB	817066

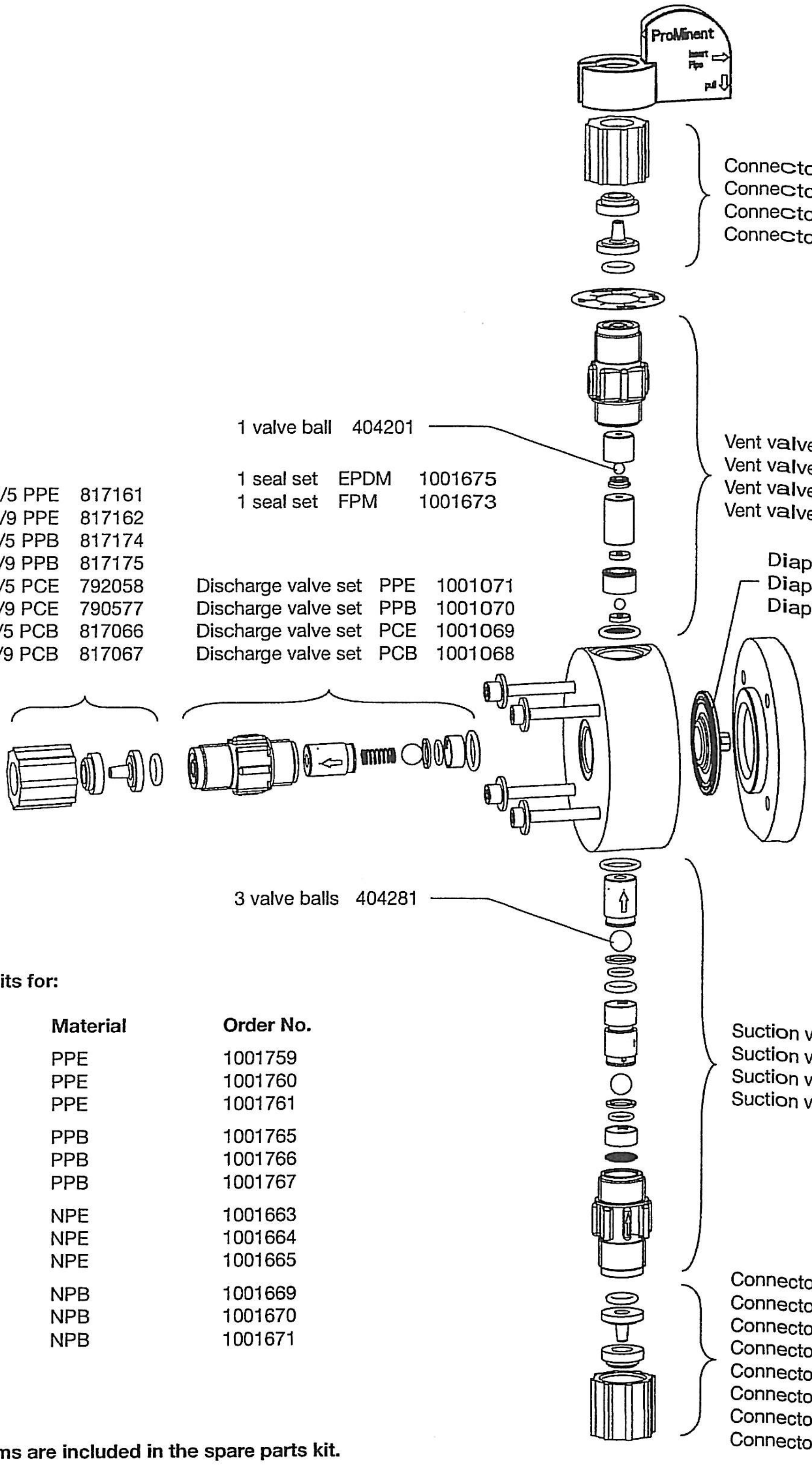
Spare parts kits for:

Type	Material	Order No.
1601	PPE	1001756
1602	PPE	1001757
1005 (1605)	PPE	1001758
1601	PPB	1001762
1602	PPB	1001763
1005 (1605)	PPB	1001764
1601	NPE	1001660
1602	NPE	1001661
1005 (1605)	NPE	1001662
1601	NPB	1001666
1602	NPB	1001667
1005 (1605)	NPB	1001668

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 0708 (1008) - 0220 (0420)
PP / NP self-degassing



Connector kit	6/4 PPE	817160
Connector kit	6/4 PPB	817173
Connector kit	6/4 PCE	791161
Connector kit	6/4 PCB	817065

Vent valve	PPE	1001063
Vent valve	PPB	1001062
Vent valve	PCE	1001061
Vent valve	PCB	1001060

1 valve ball 404201

1 seal set	EPDM	1001675
1 seal set	FPM	1001673

Connector kit	8/5 PPE	817161
Connector kit	12/9 PPE	817162
Connector kit	8/5 PPB	817174
Connector kit	12/9 PPB	817175
Connector kit	8/5 PCE	792058
Connector kit	12/9 PCE	790577
Connector kit	8/5 PCB	817066
Connector kit	12/9 PCB	817067

Discharge valve set	PPE	1001071
Discharge valve set	PPB	1001070
Discharge valve set	PCE	1001069
Discharge valve set	PCB	1001068

Diaphragm	0708	1000248
Diaphragm	0413	1000249
Diaphragm	0220	1000250

3 valve balls 404281

Suction valve set	PPE	1001437
Suction valve set	PPB	1001436
Suction valve set	PCE	1001435
Suction valve set	PCB	1001434

Connector kit	8/5 PPE	817161
Connector kit	12/9 PPE	817162
Connector kit	8/5 PPB	817174
Connector kit	12/9 PPB	817175
Connector kit	8/5 PCE	792058
Connector kit	12/9 PCE	790577
Connector kit	8/5 PCB	817066
Connector kit	12/9 PCB	817067

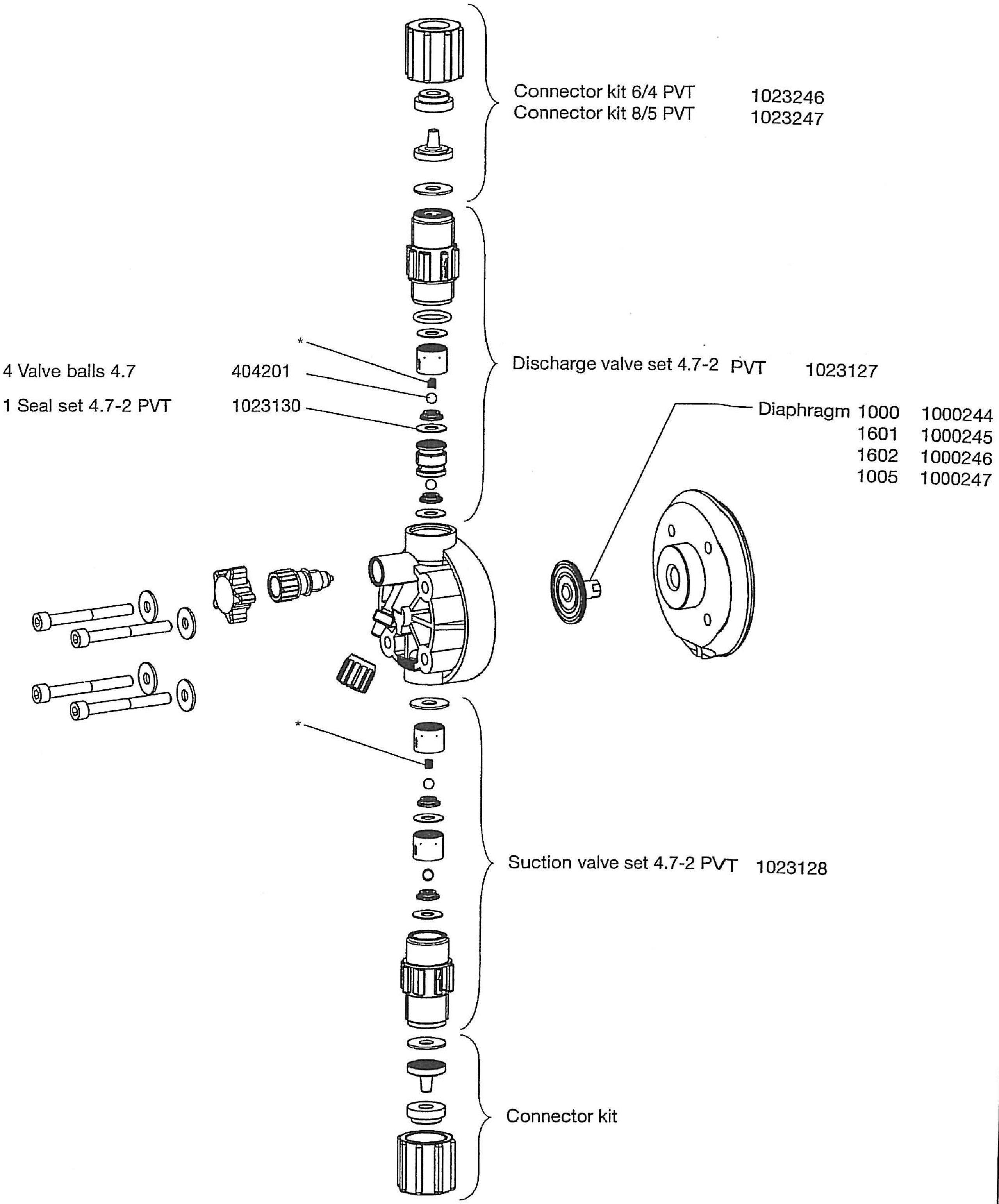
Spare parts kits for:

Type	**Material**	**Order No.**
0708 (1008)	PPE	1001759
0413 (0713)	PPE	1001760
0220 (0420)	PPE	1001761
0708 (1008)	PPB	1001765
0413 (0713)	PPB	1001766
0220 (0420)	PPB	1001767
0708 (1008)	NPE	1001663
0413 (0713)	NPE	1001664
0220 (0420)	NPE	1001665
0708 (1008)	NPB	1001669
0413 (0713)	NPB	1001670
0220 (0420)	NPB	1001671

The listed items are included in the spare parts kit.

Subject to technical alterations.

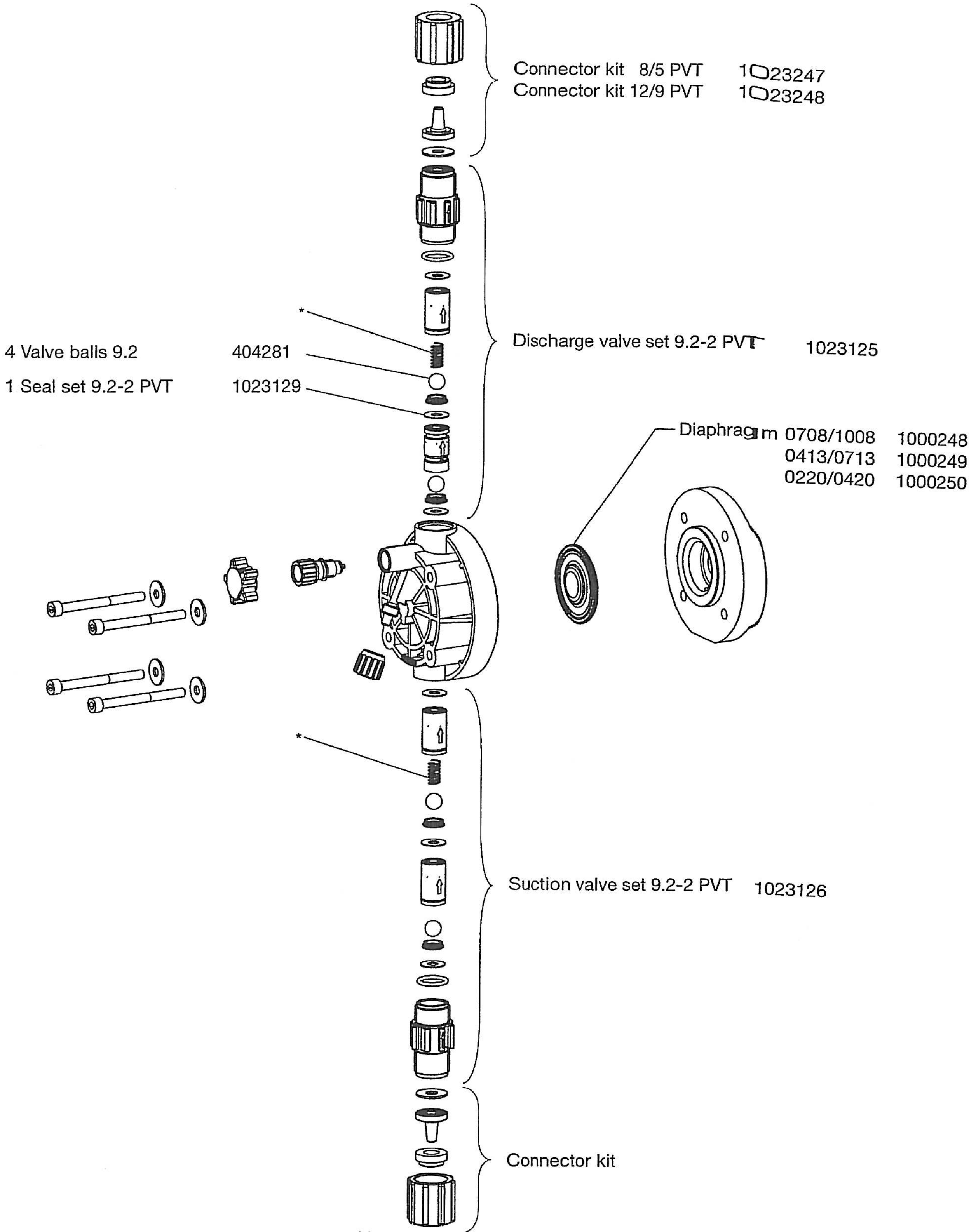
Liquid end 1000-1005 (1605)
PVT with degassing


Connector kit 6/4 PVT 1023246
Connector kit 8/5 PVT 1023247
*
4 Valve balls 4.7 404201
1 Seal set 4.7-2 PVT 1023130
Discharge valve set 4.7-2 PVT 1023127
Diaphragm 1000 1000244
1601 1000245
1602 1000246
1005 1000247
*
Suction valve set 4.7-2 PVT 1023128
Connector kit

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

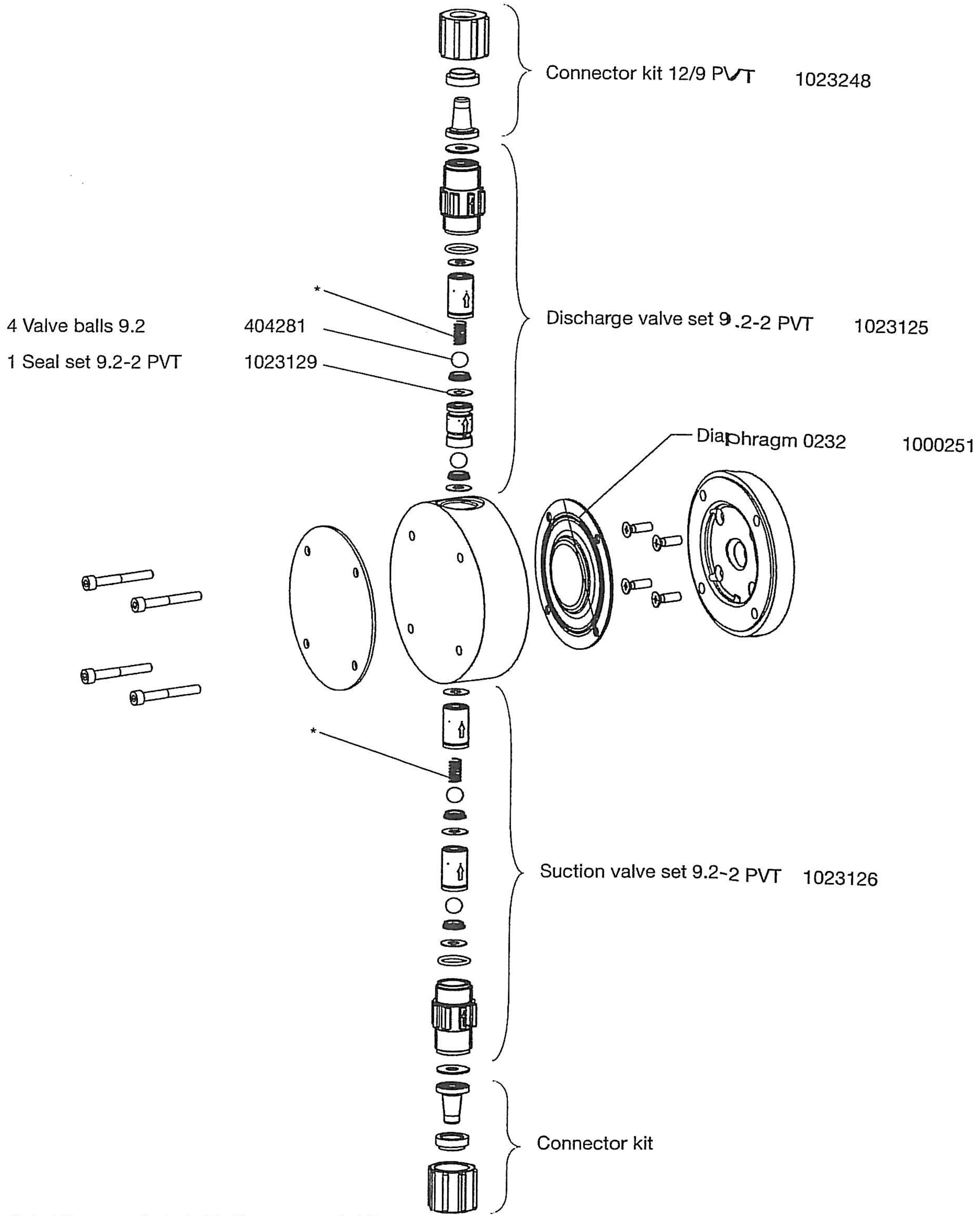
Liquid end 0708 (1008) – 0220 (0420)
PVT with degassing


Connector kit 8/5 PVT 1023247
Connector kit 12/9 PVT 1023248
4 Valve balls 9.2 404281
1 Seal set 9.2-2 PVT 1023129
Discharge valve set 9.2-2 PVT 1023125
*
Diaphragm 0708/1008 1000248
0413/0713 1000249
0220/0420 1000250
*
Suction valve set 9.2-2 PVT 1023126
Connector kit

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

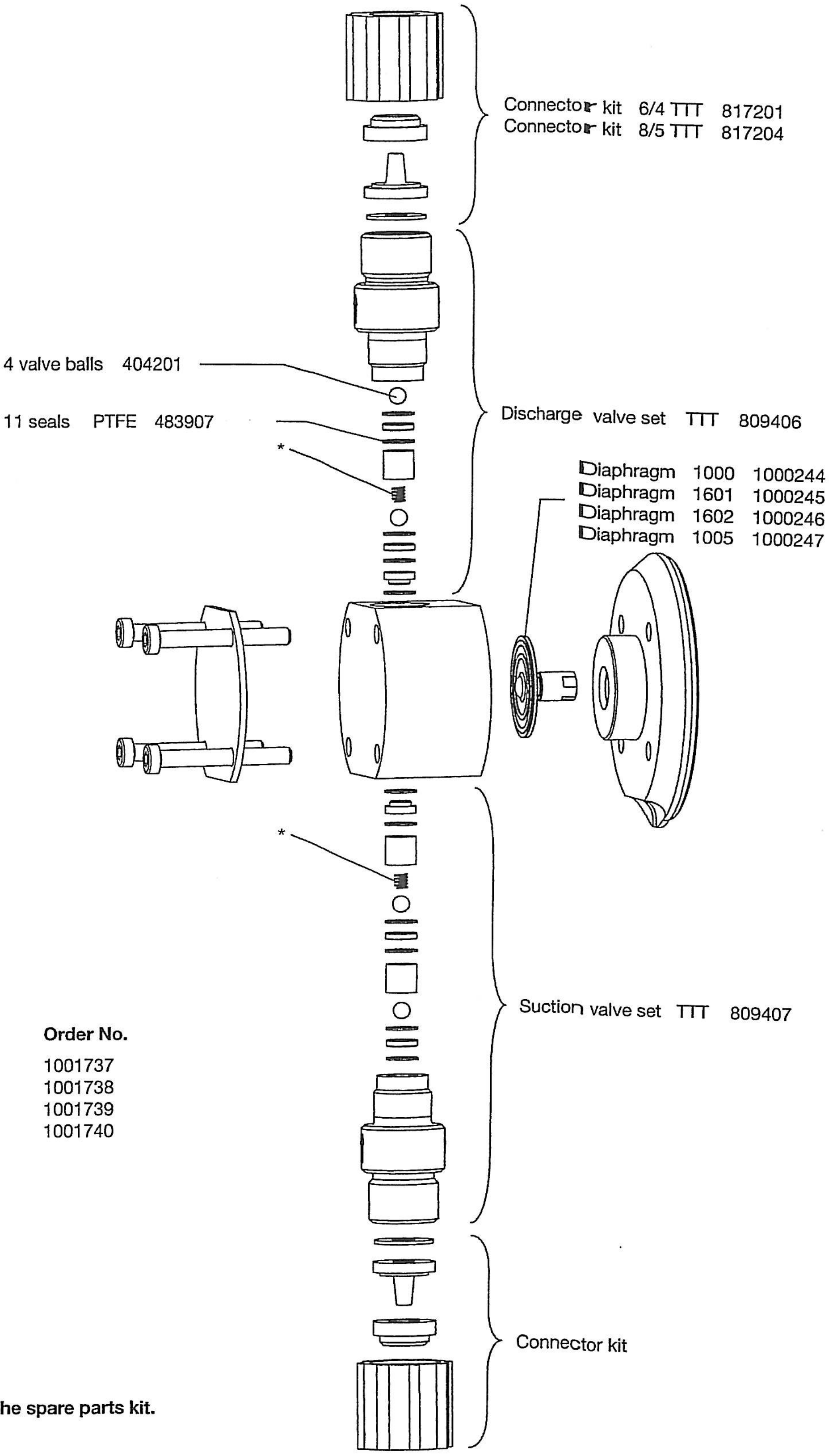
Liquid end 0232
without degassing


Connector kit 12/9 PVT 1023248
Discharge valve set 9.2-2 PVT 1023125
4 Valve balls 9.2 404281
1 Seal set 9.2-2 PVT 1023129
*
Diaphragm 0232 1000251
*
Suction valve set 9.2-2 PVT 1023126
Connector kit

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

Liquid end 1000 - 1005 (1605)
TT


Connector kit 6/4 TTT 817201
Connector kit 8/5 TTT 817204
4 valve balls 404201
11 seals PTFE 483907
*
Discharge valve set TTT 809406
Diaphragm 1000 1000244
Diaphragm 1601 1000245
Diaphragm 1602 1000246
Diaphragm 1005 1000247
*
Suction valve set TTT 809407
Connector kit

Spare parts kits for:

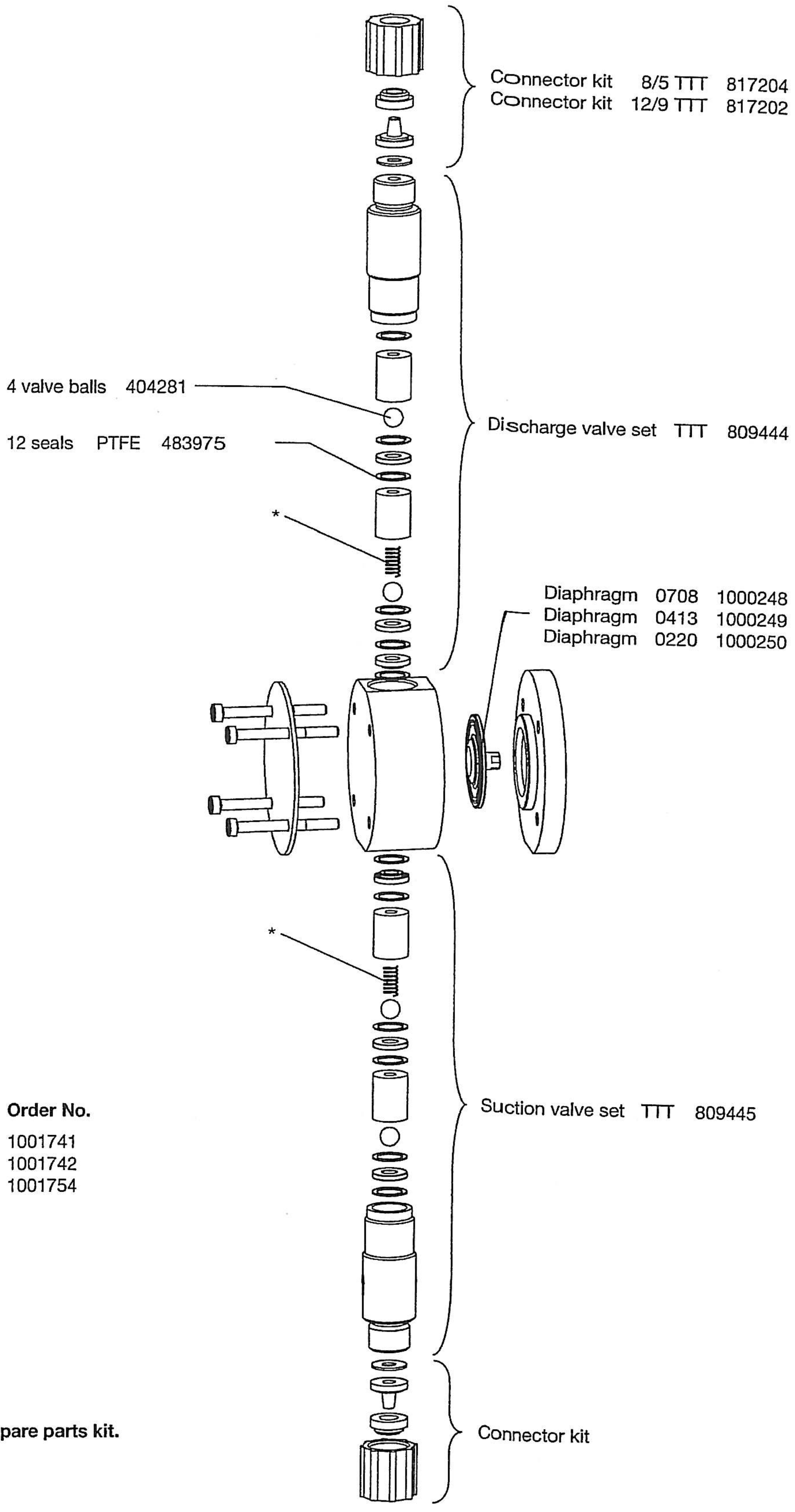
Type	Material	Order No.
1000	TTT	1001737
1601	TTT	1001738
1602	TTT	1001739
1005 (1605)	TTT	1001740

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_29-04_2

Liquid end 0708 (1008) - 0220 (0420)
TT


Connector kit 8/5 TTT 817204
Connector kit 12/9 TTT 817202
4 valve balls 404281
12 seals PTFE 483975
Discharge valve set TTT 809444
*
Diaphragm 0708 1000248
Diaphragm 0413 1000249
Diaphragm 0220 1000250
*
Suction valve set TTT 809445
Connector kit

Spare parts kits for:

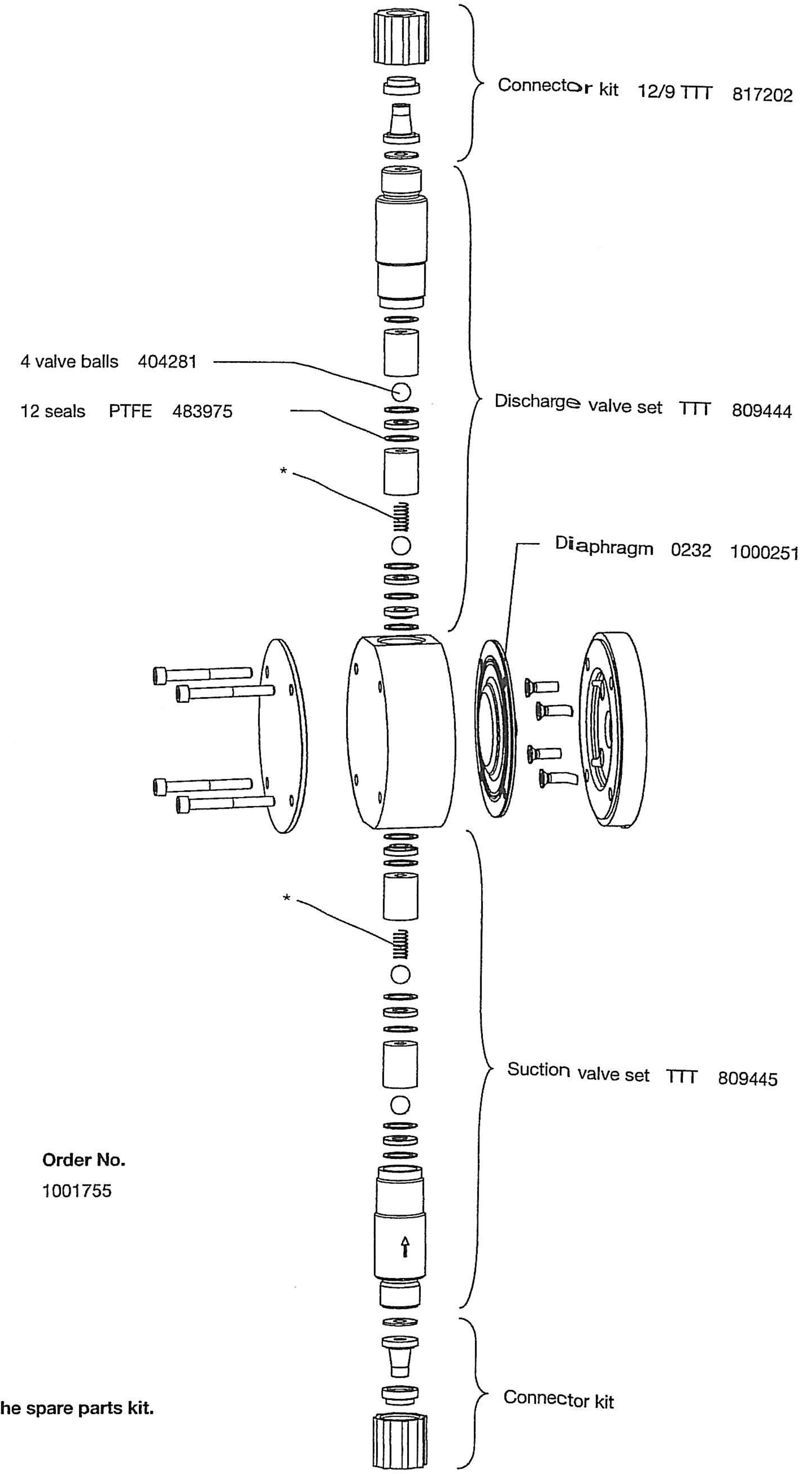
Type	Material	Order No.
0708 (1008)	TTT	1001741
0413 (0713)	TTT	1001742
0220 (0420)	TTT	1001754

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_30-04_2

Liquid end 0232
TT


Connector kit 12/9 TTT 817202
4 valve balls 404281
12 seals PTFE 483975
*
Discharge valve set TTT 809444
Diaphragm 0232 1000251
*
Suction valve set TTT 809445
Connector kit

Spare parts kits for:

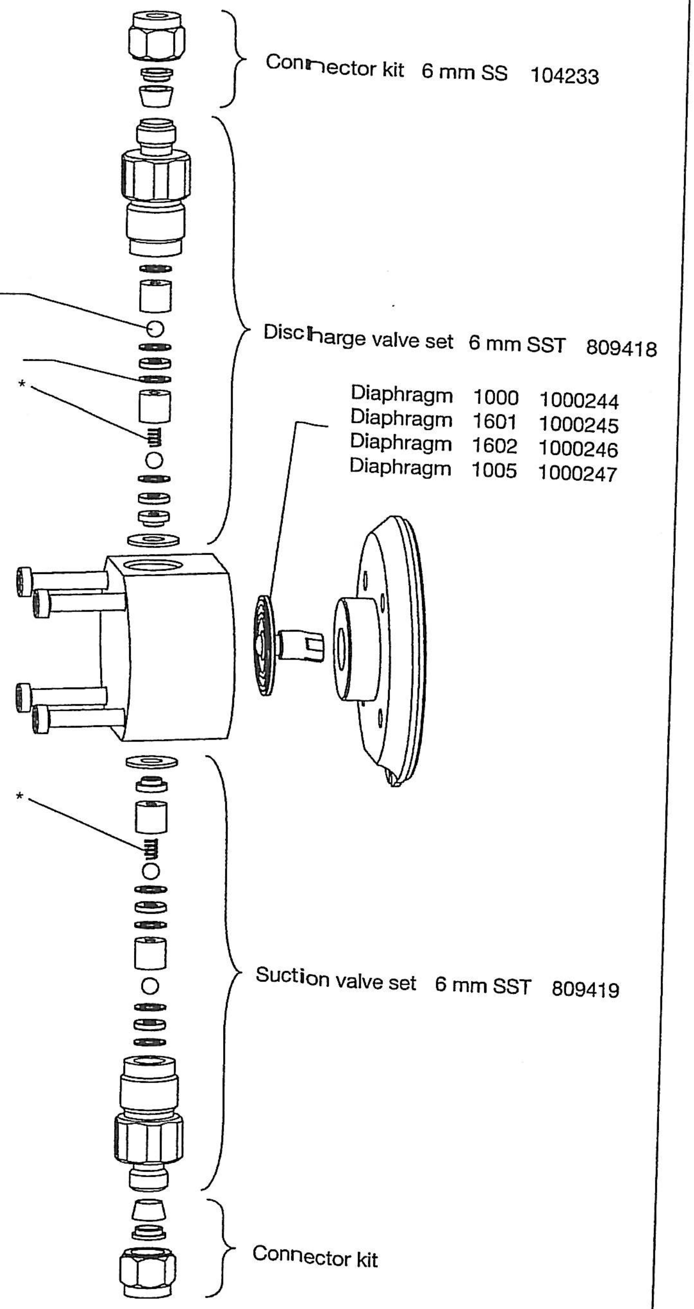
Type	**Material**	**Order No.**
0232	TTT	1001755

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_35-04_2

Liquid end 1000 - 1005 (1605)
SS


Connector kit 6 mm SS 104233
4 valve balls 404201
12 seals PTFE 483907
*
Discharge valve set 6 mm SST 809418
Diaphragm 1000 1000244
Diaphragm 1601 1000245
Diaphragm 1602 1000246
Diaphragm 1005 1000247
*
Suction valve set 6 mm SST 809419
Connector kit

Spare parts kits for:

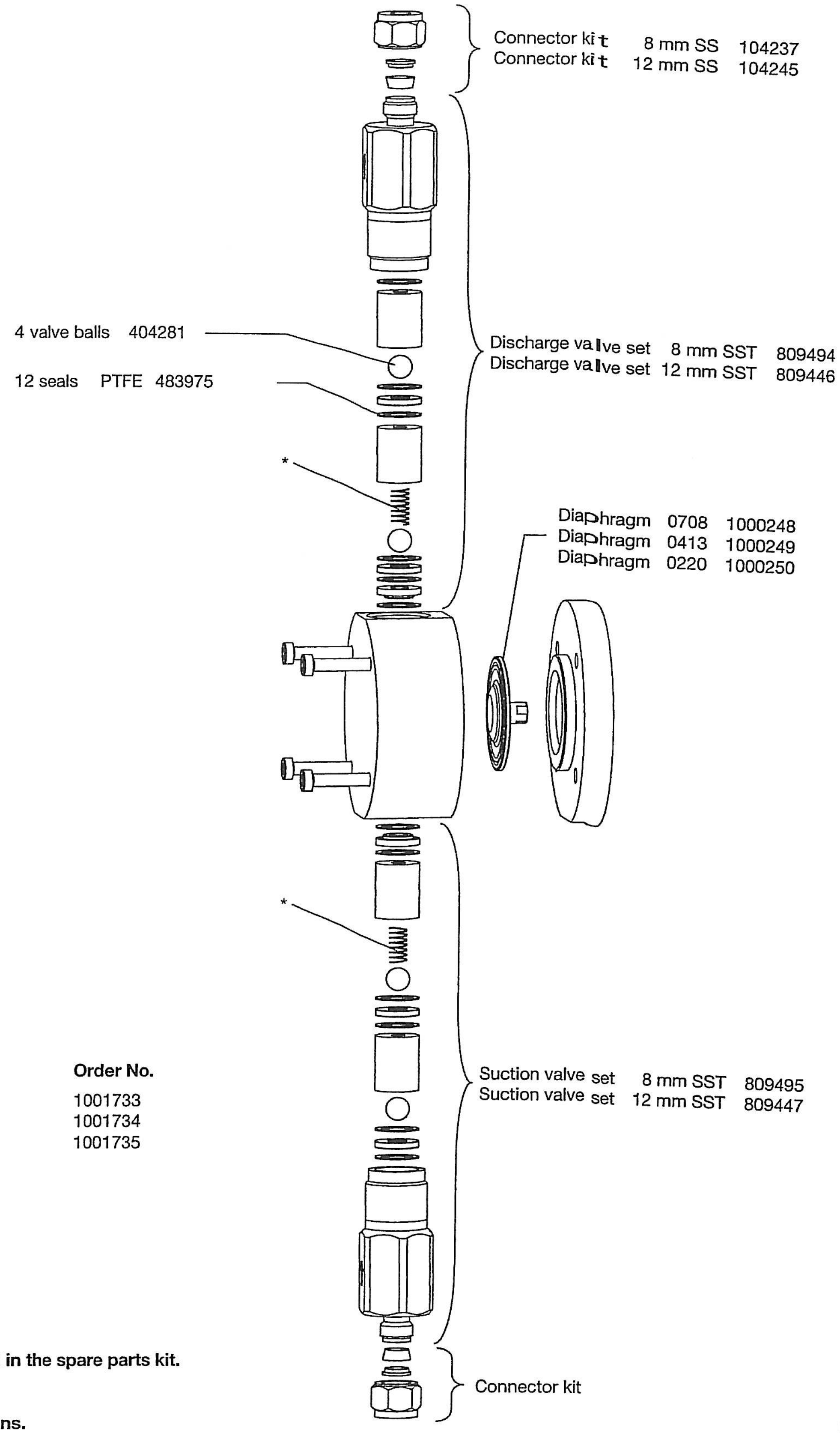
Type	Material	Order No.
1000	SST	1001729
1601	SST	1001730
1602	SST	1001731
1005 (1605)	SST	1001732

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_25-04_2

Liquid end 0708 (1008) - 0220 (0420)
SS


Connector kit 8 mm SS 104237
Connector kit 12 mm SS 104245
4 valve balls 404281
12 seals PTFE 483975
Discharge valve set 8 mm SST 809494
Discharge valve set 12 mm SST 809446
*
Diaphragm 0708 1000248
Diaphragm 0413 1000249
Diaphragm 0220 1000250
*
Suction valve set 8 mm SST 809495
Suction valve set 12 mm SST 809447
Connector kit

Spare parts kits for:

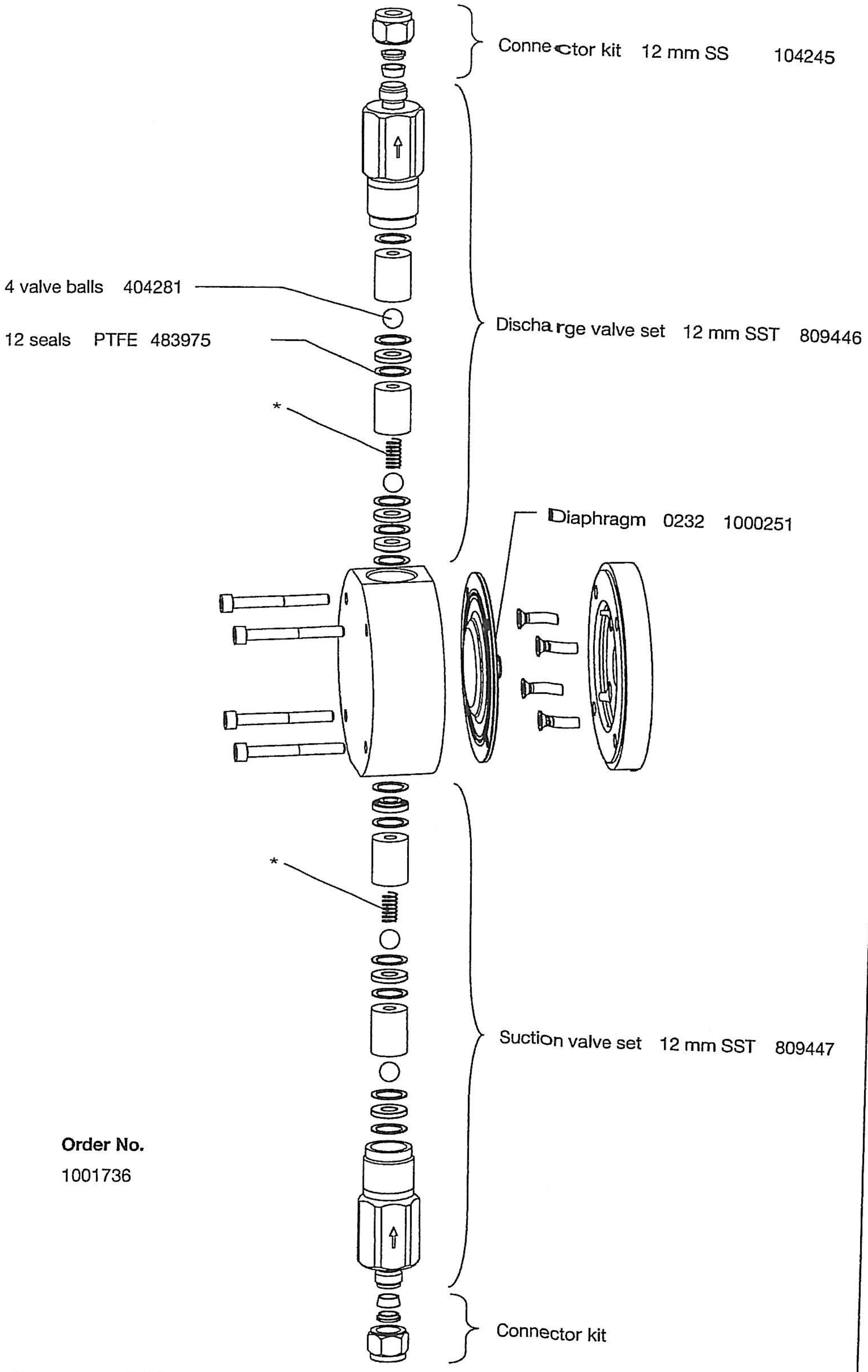
Type	Material	Order No.
0708 (1008)	SST	1001733
0413 (0713)	SST	1001734
0220 (0420)	SST	1001735

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_26-04_2

Liquid end 0232
SS


Connector kit 12 mm SS 104245
4 valve balls 404281
12 seals PTFE 483975
*
Discharge valve set 12 mm SST 809446
Diaphragm 0232 1000251
*
Suction valve set 12 mm SST 809447
Connector kit

Spare parts kits for:

Type	Material	Order No.
0232	SST	1001736

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

60_07-104_00_36-04_2